



INTERNATIONAL TELECOMMUNICATION UNION

ITU-T

TELECOMMUNICATION
STANDARDIZATION SECTOR
OF ITU

G.983.7

(11/2001)

SERIES G: TRANSMISSION SYSTEMS AND MEDIA,
DIGITAL SYSTEMS AND NETWORKS

Digital sections and digital line system – Optical line
systems for local and access networks

**ONT management and control interface
specification for dynamic bandwidth
assignment (DBA) B-PON system**

ITU-T Recommendation G.983.7

ITU-T G-SERIES RECOMMENDATIONS
TRANSMISSION SYSTEMS AND MEDIA, DIGITAL SYSTEMS AND NETWORKS

INTERNATIONAL TELEPHONE CONNECTIONS AND CIRCUITS	G.100–G.199
GENERAL CHARACTERISTICS COMMON TO ALL ANALOGUE CARRIER-TRANSMISSION SYSTEMS	G.200–G.299
INDIVIDUAL CHARACTERISTICS OF INTERNATIONAL CARRIER TELEPHONE SYSTEMS ON METALLIC LINES	G.300–G.399
GENERAL CHARACTERISTICS OF INTERNATIONAL CARRIER TELEPHONE SYSTEMS ON RADIO-RELAY OR SATELLITE LINKS AND INTERCONNECTION WITH METALLIC LINES	G.400–G.449
COORDINATION OF RADIOTELEPHONY AND LINE TELEPHONY TESTING EQUIPMENTS	G.450–G.499
TRANSMISSION MEDIA CHARACTERISTICS	G.500–G.599
DIGITAL TERMINAL EQUIPMENTS	G.600–G.699
DIGITAL NETWORKS	G.700–G.799
DIGITAL SECTIONS AND DIGITAL LINE SYSTEM	G.800–G.899
General	G.900–G.999
Parameters for optical fibre cable systems	G.900–G.909
Digital sections at hierarchical bit rates based on a bit rate of 2048 kbit/s	G.910–G.919
Digital line transmission systems on cable at non-hierarchical bit rates	G.920–G.929
Digital line systems provided by FDM transmission bearers	G.930–G.939
Digital line systems	G.940–G.949
Digital section and digital transmission systems for customer access to ISDN	G.950–G.959
Optical fibre submarine cable systems	G.960–G.969
Optical line systems for local and access networks	G.970–G.979
Access networks	G.980–G.989
	G.990–G.999

For further details, please refer to the list of ITU-T Recommendations.

**ONT MANAGEMENT AND CONTROL INTERFACE SPECIFICATION FOR
DYNAMIC BANDWIDTH ASSIGNMENT (DBA) B-PON SYSTEM**

Summary

This Recommendation describes the ONT management and control interface (OMCI) specifications required for the Dynamic Bandwidth Assignment (DBA) function in a Broadband Passive Optical Network (B-PON) system.

This Recommendation builds on the core functions specified in ITU-T G.983.2 and specifies managed entities of a protocol-independent Management Information Base (MIB) that models the exchange of information between OLT and ONT.

Source

ITU-T Recommendation G.983.7 was prepared by ITU-T Study Group 15 (2001-2004) and approved under the WTSA Resolution 1 procedure on 29 November 2001.

FOREWORD

The International Telecommunication Union (ITU) is the United Nations specialized agency in the field of telecommunications. The ITU Telecommunication Standardization Sector (ITU-T) is a permanent organ of ITU. ITU-T is responsible for studying technical, operating and tariff questions and issuing Recommendations on them with a view to standardizing telecommunications on a worldwide basis.

The World Telecommunication Standardization Assembly (WTSA), which meets every four years, establishes the topics for study by the ITU-T study groups which, in turn, produce Recommendations on these topics.

The approval of ITU-T Recommendations is covered by the procedure laid down in WTSA Resolution 1.

In some areas of information technology which fall within ITU-T's purview, the necessary standards are prepared on a collaborative basis with ISO and IEC.

NOTE

In this Recommendation, the expression "Administration" is used for conciseness to indicate both a telecommunication administration and a recognized operating agency.

INTELLECTUAL PROPERTY RIGHTS

ITU draws attention to the possibility that the practice or implementation of this Recommendation may involve the use of a claimed Intellectual Property Right. ITU takes no position concerning the evidence, validity or applicability of claimed Intellectual Property Rights, whether asserted by ITU members or others outside of the Recommendation development process.

As of the date of approval of this Recommendation, ITU had not received notice of intellectual property, protected by patents, which may be required to implement this Recommendation. However, implementors are cautioned that this may not represent the latest information and are therefore strongly urged to consult the TSB patent database.

© ITU 2002

All rights reserved. No part of this publication may be reproduced or utilized in any form or by any means, electronic or mechanical, including photocopying and microfilm, without permission in writing from ITU.

CONTENTS

	Page
1 Scope.....	1
2 References.....	1
3 Abbreviations.....	1
4 Reference model and terms.....	2
4.1 OMCI in ITU-T G.983.4.....	2
4.2 ONT functions	2
4.3 VP Mux functionality in the ONT	4
5 Requirements of the management interface specification	4
5.1 Configuration management.....	4
5.2 Fault management.....	4
5.3 Performance management.....	5
5.4 Security management.....	5
6 Protocol-independent MIB for the OMCI	5
6.1 Managed entities associated with DBA function.....	5
6.2 Managed entities relation diagrams	5
7 MIB description	7
7.1 ONT equipment management.....	7
7.1.1 ONTAPON	7
7.1.2 PON IF line card.....	8
7.2 ANI management.....	9
7.2.1 ANI.....	9
7.2.2 T-CONT buffer.....	10
7.3 Traffic management.....	11
7.3.1 Priority QueueAPON.....	11
7.3.2 Traffic Scheduler	12
8 ONT management and control channel (OMCC).....	14
9 ONT management and control protocol	14
Appendix I – DBA related sequence scenario	14
I.1 Initial handshake	14
I.2 Addition of T-CONT in an ONT	15
I.3 Deletion of T-CONT in an ONT.....	16
Appendix II – An example of the Traffic Scheduler configuration.....	17

ITU-T Recommendation G.983.7

ONT MANAGEMENT AND CONTROL INTERFACE SPECIFICATION FOR DYNAMIC BANDWIDTH ASSIGNMENT (DBA) B-PON SYSTEM

1 Scope

This Recommendation describes the OMCI specifications required for the Dynamic Bandwidth Assignment (DBA) function in a Broadband Passive Optical Network (B-PON) system. The OMCI specifications are based on and complement the core functionality described in ITU-T G.983.2.

This Recommendation describes the ONT/ONU model and MIB relation diagrams.

It further describes the additional managed entities in order to specify the T-CONT buffer and schedule functions. Moreover, some existing managed entities are augmented with new attributes.

Appendix I describes the initial handshake and addition or deletion scenarios of T-CONT buffers.

2 References

The following ITU-T Recommendations and other references contain provisions, which, through reference in this text, constitute provisions of this Recommendation. At the time of publication, the editions indicated were valid. All Recommendations and other references are subject to revision; users of this Recommendation are therefore encouraged to investigate the possibility of applying the most recent edition of the Recommendations and other references listed below. A list of the currently valid ITU-T Recommendations is regularly published.

References cited in ITU-T G.983.1 and G.983.2 are also applied to this Recommendation but are not reproduced to avoid redundancy.

[1] ITU-T G.983.1 (1998), *Broadband optical access systems based on Passive Optical Networks (PON)*. Also refer to the Corrigendum 1 (June, 1999).

[2] ITU-T G.983.2 (2000), *ONT management and control interface specification for ATM PON*.

[3] ITU-T G.983.4 (2001), *A broadband optical access system with increased service capability using dynamic bandwidth assignment*.

3 Abbreviations

This Recommendation uses the following abbreviations:

AAL	ATM Adaptation Layer
ANI	Access Node Interface
ATM	Asynchronous Transfer Mode
B-ISDN	Broadband Integrated Services Digital Network
B-PON	Broadband Passive Optical Networks
CRC	Cyclic Redundancy Check
DBA	Dynamic Bandwidth Assignment
FTTB	Fibre to the Building
FTTBusiness	Fibre to the Business

FTTC	Fibre to the Curb
FTTCab	Fibre to the Cabinet
FTTH	Fibre to the Home
HOL	Head of the Line
ME	Managed Entity
MIB	Management Information Base
OAM	Operation, Administration and Maintenance
OLT	Optical Line Termination
OMCI	ONT Management and Control Interface
ONT	Optical Network Termination
PON	Passive Optical Network
QoS	Quality of Service
UNI	User Network Interface
VC	Virtual Channel
VP	Virtual Path
WRR	Weighted Round Robin

4 Reference model and terms

4.1 OMCI in ITU-T G.983.4

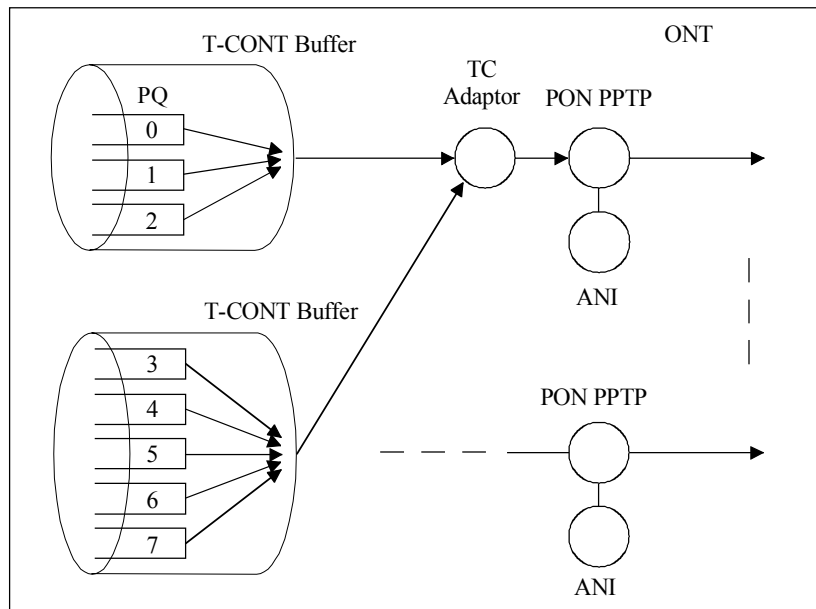
See 4.1/G.983.2.

4.2 ONT functions

The functions in the whole ONT are described in 4.2/G.983.2 and Figure 2/G.983.2. This clause focuses on the ANI side in the ONT.

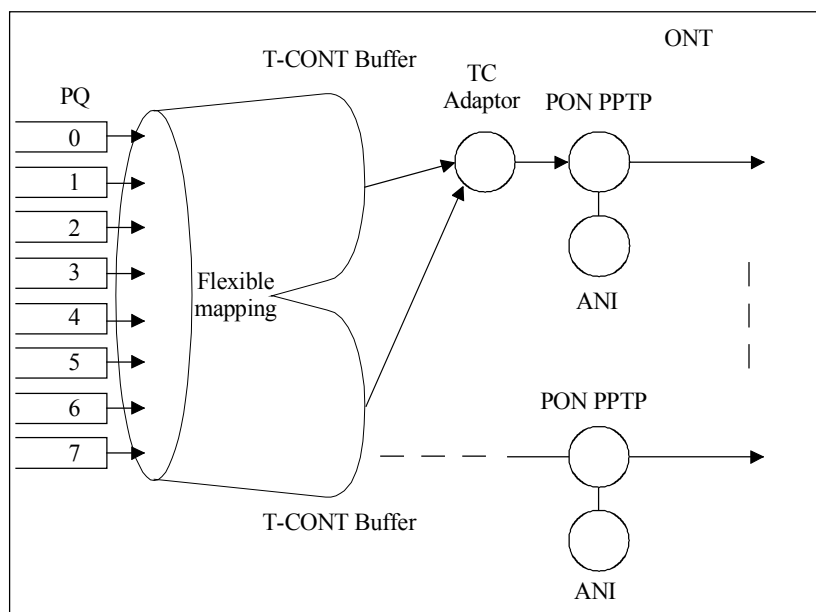
A T-CONT buffer managed entity is introduced in order to specify the DBA function. T-CONT buffer can contain Priority Queues and Traffic Schedulers and be associated with the TC Adapter. Two models are considered as to the association between the T-CONT buffers and Priority Queues or Traffic Schedulers.

In model 1, the Priority Queues, Traffic Schedulers and the T-CONT Buffers are inherently associated with each other in a fixed fashion. In model 2, the Priority Queues, Traffic Schedulers and T-CONT buffers can be associated flexibly. Figures 1 and 2 show the two models.



T1544540-01

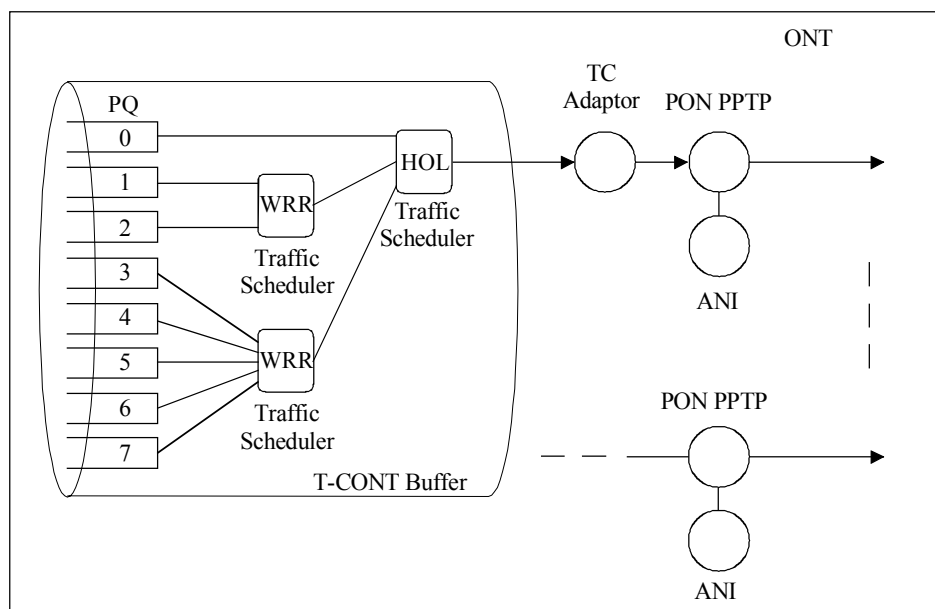
Figure 1/G.983.7 – ONT model 1



T1544550-01

Figure 2/G.983.7 – ONT model 2

The simplest and default configuration is for the Priority Queues and T-CONT buffers. This can guarantee the minimum delay of traffic assuming enough bandwidth is provided for the ONT. Optionally, one or more stages of WRR and/or HOL scheduling can be installed in order to guarantee minimum bandwidths, classes of services, and other traffic controls. A multi-stage Traffic Scheduler can be implemented as shown in Figure 3 as an example.



T1544560-01

Figure 3/G.983.7 – ONT model with traffic scheduler

4.3 VP Mux functionality in the ONT

See clause 4/G.983.2.

5 Requirements of the management interface specification

See clause 5/G.983.2.

5.1 Configuration management

Configuration management provides functions to exercise control over, identify, collect data from and provide data for the ONT. This involves the following:

- 1) Configuration of equipment.
- 2) Configuration of the UNIs.
- 3) Configuration of the VP Network CTPs and ATM Cross-Connections.
- 4) Configuration of interworking VCC termination points (non-ATM UNIs only).
- 5) Configuration of the OAM flows.
- 6) Configuration of the physical ports.
- 7) Configuration of AAL profiles.
- 8) Configuration of service profiles.
- 9) Configuration of traffic descriptors.
- 10) Configuration of T-CONT buffers and Traffic Schedulers.

ATM VC management is not a part of this Recommendation. (See [1] in Appendix V and [9] in clause 2/G.983.2.)

5.2 Fault management

See 5.2/G.983.2.

5.3 Performance management

See 5.3/G.983.2.

5.4 Security management

See 5.4/G.983.2.

6 Protocol-independent MIB for the OMCI

See clause 6/G.983.2.

6.1 Managed entities associated with DBA function

The managed entities in Table 1 shall be defined in addition to the managed entities defined in ITU-T G.983.2.

The managed entities in Table 2 shall change the required/optional level because of DBA function.

Table 1/G.983.7 – Additional managed entities on the OMCI

Managed Entity	Required/Optional	Description
Traffic Scheduler	CR	Used when Traffic Scheduler is used.
T-CONT Buffer	CR	Used when one or more T-CONT buffers are supported.

Table 2/G.983.7 – Modified managed entities on the OMCI

Managed Entity	Required/Optional	Description
ANI	CR	New attributes are necessary for DBA function.

Conditional Requirements (CR): Entities necessary when the specified optional function is implemented.

6.2 Managed entities relation diagrams

Figures 4 and 5 show the managed entity relation diagrams.

Figure 4 shows an ONT with cardholders on both UNI and ANI sides. Figure 5 shows the ATM VP cross connection function with T-CONT buffer. A new managed entity "T-CONT Buffer" appears in both figures.

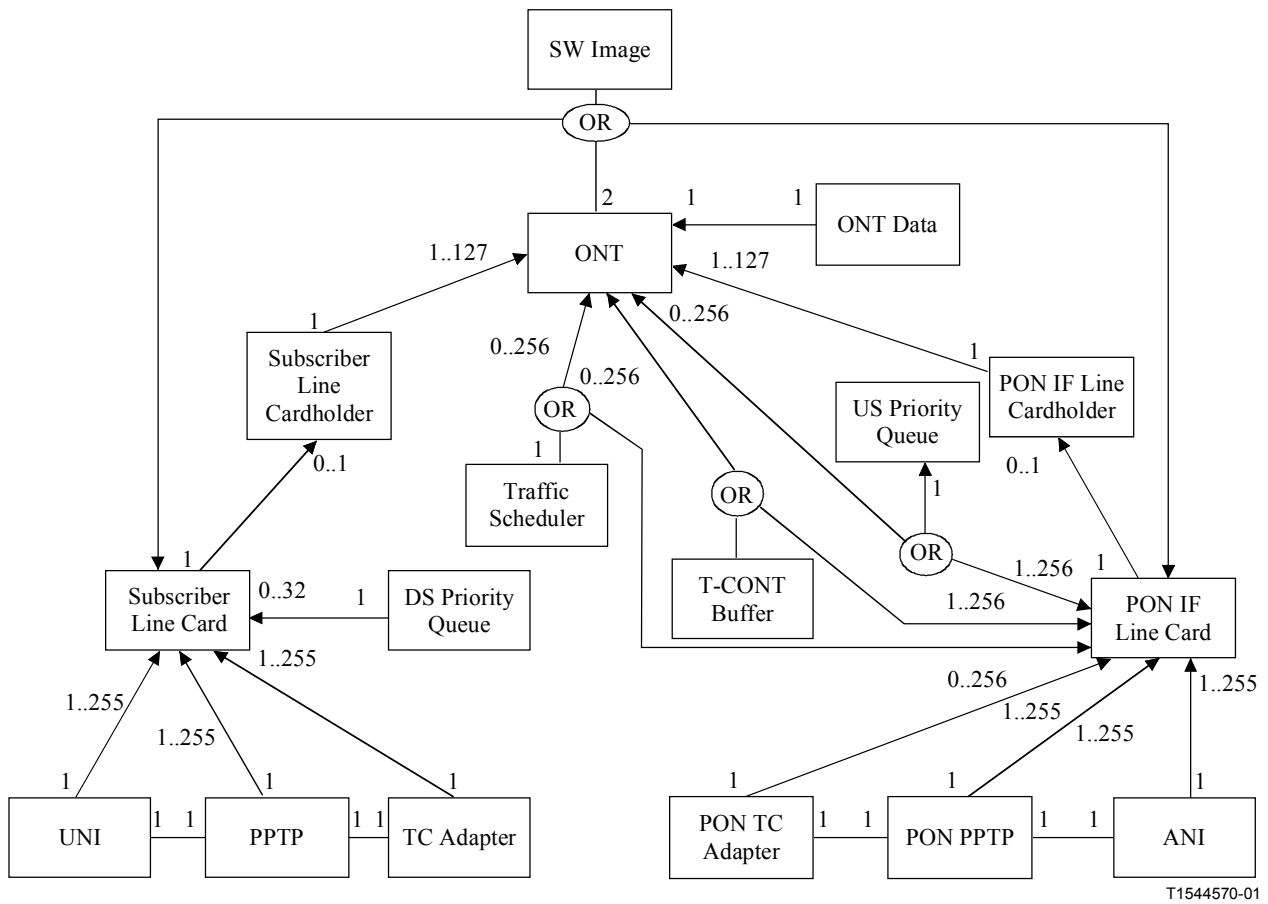


Figure 4/G.983.7 – Managed entity relation diagram for non-integrated interfaces

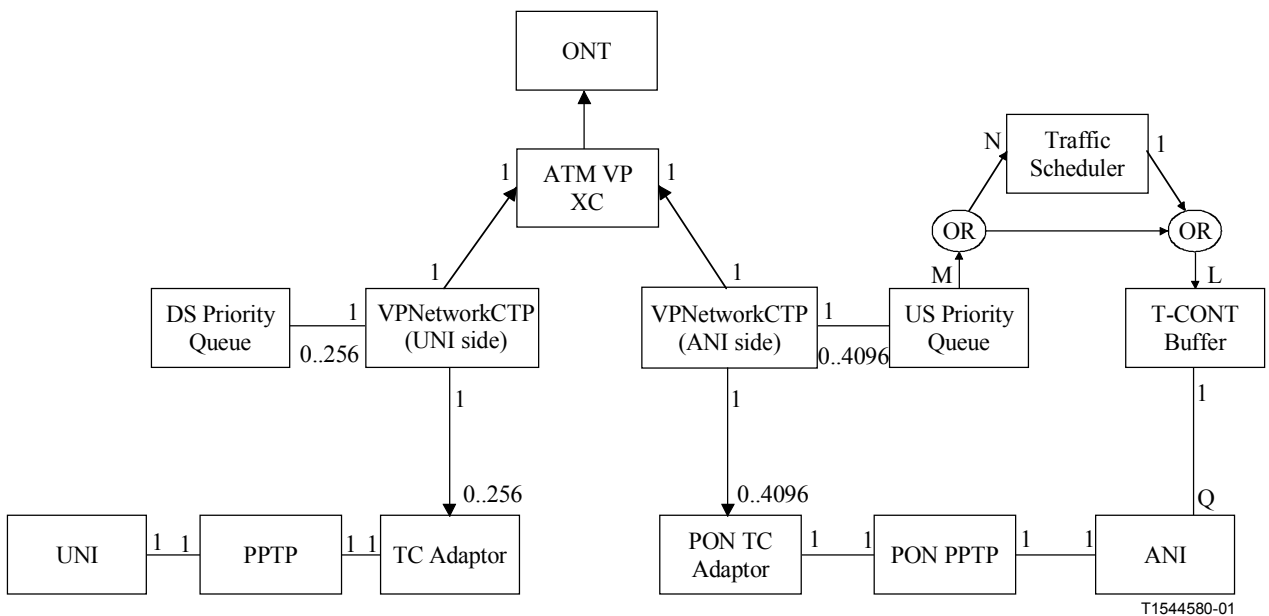


Figure 5/G.983.7 – Managed entity relation diagram, ATM service

7 MIB description

DBA function causes modification of managed entities and creation of new managed entities. In this clause, modified or new managed entities are described. Other managed entities are referred to ITU-T G.983.2.

7.1 ONT equipment management

7.1.1 ONT_{APON}

This managed entity represents the ONT as equipment.

An instance of this managed entity is automatically created by the ONT after initialization. After the creation of this managed entity, the associated attributes are updated according to the data within the ONT itself.

The total number of T-CONT buffers and total number of Traffic Schedulers in the ONT core are included in this managed entity as attributes.

Relationships

All other managed entities in this Recommendation and ITU-T G.983.2 are related directly or indirectly to the ONT_{APON} entity.

Attributes

Managed Entity id: This attribute provides a unique number for each instance of this managed entity. There is only one instance and it has the number 0x0000. (R) (mandatory) (2 bytes).

Vendor id: This attribute identifies the vendor of the ONT. Upon autonomous instantiation, this attribute consists of all spaces. (R) (mandatory) (4 bytes).

Version: This attribute identifies the version of the ONT as defined by the vendor. The printable value of "0" shall be used when version information is not available or applicable to the ONT being represented. Upon autonomous instantiation, this attribute consists of all spaces. (R) (mandatory) (14 bytes).

Serial number: The serial number is unique for each ONT. Note that the serial number of ONT is already defined in ITU-T G.983.1 and contains the vendor id and/or the version number. Upon autonomous instantiation this attribute consists of all spaces. (R) (mandatory) (8 bytes).

Traffic management option: This attribute identifies the upstream traffic management function implemented in the ONT. There are two options:

- 1) "Priority controlled or scheduled upstream traffic" (0x00): the upstream traffic coming from the user is given a priority. Otherwise the minimum upstream traffic of each T-CONT Scheduler is guaranteed.
- 2) "Cell rate controlled upstream traffic" (0x01): the maximum upstream traffic of each individual connection is guaranteed. For more clarification see Appendix IV G.983.2.

Note that the Traffic management option will not apply to downstream traffic. In other words, there is no need for a traffic descriptor for the downstream direction and downstream priority queues can be used. Upon autonomous instantiation, this attribute is set to 0x00. (R) (mandatory) (1 byte).

VP cross-connection

function option: This attribute identifies the support of ATM VP Cross-Connection management functions for the interworking connections to non-ATM UNIs. The value is set to 0x00 in case ATM VP Cross-Connection management functions are not modelled. The value is set to 0x01 in case the ATM VP Cross-Connection management functions are modelled. The default value of this attribute is 0x01. (R) (mandatory) (1 byte).

Battery backup: This attribute provides a Boolean indication whether or not the ONT supports battery backup. False will indicate that no battery is provisioned; true indicates that a battery is provisioned. Upon autonomous instantiation, this attribute is set to false. (R, W) (mandatory) (1 byte).

Total T-CONT

buffer number: This attribute provides a total number of T-CONT buffers, which are not associated with the PON IF line card. (R) (mandatory) (1 byte).

Total Priority

Queue number: This attribute provides a total number of priority queues, which are not associated with the PON IF line card. (R) (mandatory) (1 byte).

Total Traffic

Scheduler number: This attribute provides a total number of Traffic Schedulers, which are not associated with the PON IF line card. The ONT supports NULL function, HOL (Head Of the Line) scheduling and WRR (Weighted Round Robin) from the priority control and guarantee of minimum rate control points of view, respectively. If the ONT doesn't have any Traffic Scheduler, this attribute should be 0x00. (R) (mandatory) (1 byte).

Actions

Same as ITU-T G.983.2.

Notifications

Same as ITU-T G.983.2.

7.1.2 PON IF line card

This managed entity is used to model a field replaceable PON IF Line Card contained within an ONT.

An instance of this managed entity shall be automatically created by the ONT.

Relationships

One instance of this managed entity is contained by an instance of the PON IF Line Cardholder.

Attributes

Managed Entity id: This attribute provides a unique number for each instance of this managed entity. The number used is the same as the instance number used for the PON IF Line Cardholder managed entity instance containing this PON IF Line Card instance. (R) (mandatory) (2 bytes).

Serial number: The serial number is unique for each PON IF Line Card. Upon autonomous instantiation, this attribute consists of all spaces. (R) (mandatory) (8 bytes).

Version: This attribute identifies the version of the PON IF Line Card as defined by the vendor. Upon autonomous instantiation, this attribute consists of all spaces. (R) (mandatory) (14 bytes).

Vendor id: This attribute identifies the vendor of the PON IF Line Card. Upon autonomous instantiation, this attribute consists of all spaces. (R) (optional) (4 bytes).

Total T-CONT buffer number: This attribute provides a total number of T-CONT buffers, which are associated with the PON IF line card. (R) (mandatory) (1 byte).

Total priority queue number: This attribute provides a total number of priority queues, which are associated with the PON IF line card. (R) (mandatory) (1 byte).

Total Traffic Scheduler number: This attribute provides a total number of Traffic Schedulers, which are associated with the PON IF line card. The ONT can support NULL function, HOL (Head Of the Line) scheduling and WRR (Weighted Round Robin) from the priority control and guarantee of minimum rate control points of view, respectively. If the ONT does not have any Traffic Scheduler, this attribute should be 0x00. (R) (mandatory) (1 byte).

Actions

Same as ITU-T G.983.2.

Notifications

Same as ITU-T G.983.2.

7.2 ANI management

In order to support multi T-CONT or SR function the ANI ME shall be modified. Moreover, the T-CONT buffer managed entity shall be added. ANI and T-CONT buffer ME should have actions and notifications and shall be uploaded in the MIB upload.

7.2.1 ANI

This managed entity is used to organize data associated with the Access Network Interface (ANI) supported by the ONT. One instance of this managed entity shall exist for each port of ANI in the ONT.

An instance of this managed entity is automatically created by the ONT after initialization.

Relationships

One or more instances of this managed entity are contained in an instance of the ONT or PON IF Line Card managed entities.

Attributes

Managed Entity id: This attribute provides a unique number for each instance of this managed entity. This 2-byte number is directly associated with the physical position of the PON IF. The assigned number is the same as the id of the PON Physical Path Termination Point with which this ANI is associated. (R) (mandatory) (2 bytes).

SR indication: This Boolean attribute indicates the capability of status reporting. The value TRUE means that the status reporting is available for all T-CONT buffers which are associated with the ANI. (R) (Mandatory) (1 byte).

Total Data Grant: This attribute provides the total number of data grants that are able to be supported in this ANI port. (R) (Mandatory) (1 byte).

Total DS Grant: This attribute provides the total number of divided slot grants that are able to be supported in this ANI port. (R) (Mandatory) (1 byte).

T-CONT reporting types: This attribute provides a special code that indicates the kinds of reports that this ONT can perform. Value 0x00 means that T-CONT buffer reporting uses one byte. Value 0x01 means that T-CONT buffer reporting uses one byte or two bytes. Value 0x02 means that T-CONT buffer reporting uses one byte or two or four bytes. More explanation is described in ITU-T G.983.4. (R) (Optional) (1 byte).

Actions

Get: Get one or more attributes.

Notifications

Attribute Value

Change: This notification is used to report autonomous changes of attributes of this managed entity. The notification shall identify its new value.

7.2.2 T-CONT buffer

An instance of this managed entity represents a logical object to the data grant provided by the OLT. A T-CONT buffer can accommodate ATM cells in priority queues or Traffic Schedulers that exist in the ATM layer. Therefore the T-CONT buffer is regarded as a logical buffer and it does not have the QoS control function.

Please note that T-CONT buffer does not mean the T-CONT sub-layer.

Relationships

One or more instances of this managed entity are contained in an instance of the ONT managed entity.

Attributes

Managed Entity id: This attribute provides a unique number for each instance of this managed entity. This 2-byte number is associated with the physical capability that realizes the T-CONT buffer. The first byte is the slot id of the PON IF card with which this T-CONT buffer is associated. For integrated PON IF interfaces, this byte can be associated with "pseudo" slot id 0x80 (128). If the ONT has T-CONT buffers that are not associated with the PON IF card at the creation of this instance, the first byte of this T-CONT buffer is 0xFF. The second byte is the T-CONT id that is numbered by the ONT itself. The T-CONT id is numbered in ascending order with the range of 0x00 to 0xFF in each PON-IF Line Card or ONT core. (R) (mandatory) (2 bytes).

ANI Pointer: This attribute provides the ANI instance id in which this T-CONT buffer can send ATM cells in response to one of data grants. Upon autonomous instantiation this attribute consists of the 0x8001 or 0x8101. (The default value should be decided in consideration of the backward compatibility.) (R, W) (Mandatory) (2 byte).

Policy: This attribute represents scheduling policy. Valid values include but are not limited to "Null"(value 0x00), "HOL"(value 0x01) or "WRR"(value 0x02). Upon autonomous instantiation this attribute consists of the 0x01. (R) (mandatory) (1 byte).

Actions

Get: Get one or more attributes.

Set: Set one or more attributes.

Notifications

None.

7.3 Traffic management

7.3.1 Priority Queue_{APON}

This managed entity specifies the priority queue in the ONT that is used for the VP Network CTP_{APON}.

Priority Queues used for the upstream traffic are created by the ONT after initialization. All the Priority Queues used for the downstream traffic are created/deleted by the ONT after the creation/deletion of the Subscriber Line Card.

The following assumption is made in order to simplify the queue management. The maximum number of upstream or downstream priority queues is 256 per equipment, such as ONT or PON IF Line Card. If N priority queues reside in the ONT, the Subscriber Line Card, ONT core or PON IF Line Card, N priority queue management entities will be automatically created by the ONT following the creation of the related equipment. Note that the OLT will find all the queues by reading the Priority Queue_{APON} managed entity instances. If the OLT tries to retrieve a non-existing Priority Queue, this will be indicated in the response from the ONT to the OLT.

One or more Priority Queues should be created in the PON IF Linecard in order to guarantee the backward compatibility with the G.983.2 ONT.

See also Appendix IV G.983.2.

Upstream priority queues can be added to the ONT. Moreover priority queues can exist in the ONT core and subscriber line cards as well as PON IF Line Cards. Therefore the managed entity id definition is extended.

In order to have a flexible connection between the priority queues and Traffic Schedulers and T-CONT buffers new attributes are added.

In order to configure the optional Traffic Scheduler, the Weight attribute is also added.

Relationships

One or more instances of this managed entity shall be contained in the ONT_{APON} managed entity to model the upstream direction if the Traffic Management Option attribute in ONT is 0x00. One or more instances of this managed entity shall be associated with the Subscriber Line Card managed entity as downstream priority queue_{APON}. For the ONT that has one or more fixed user interfaces, one or more instances shall be contained in the ONT managed entity for the downstream direction.

Attributes

Managed Entity id: This attribute provides a unique number for each instance of this managed entity. The first byte is the slot id of the Subscriber Line Card or PON IF card with which this queue is associated. For integrated Subscriber Line/PON IF interfaces, this byte can be associated with "pseudo" slot ids 0x00, 0x80 (128), respectively. If the ONT has upstream priority queues that are not associated with the PON IF card at the creation of this instance, the first byte of this priority queue is 0xFF. The second byte is the priority of this queue

(0x00 indicates the highest priority, and 0xFF (255) the lowest). The second byte is numbered by the ONT itself. (R) (mandatory) (2 bytes).

Queue Configuration

Option: This attribute identifies the buffer-partitioning policy. The value of 0x01 means that all the queues share one buffer size of Maximum Queue Size and the value 0x00 means that each queue uses its individual buffer size of Maximum Queue Size. (R) (mandatory) (1 byte).

Maximum

Queue Size: This attribute specifies the maximum size of the queue. (R) (mandatory) (2 bytes).

Allocated Queue

Size: This attribute identifies the allocated size of this queue. (R, W) (mandatory) (2 bytes).

Discard-cell-counter

reset interval: This attribute represents the interval in milliseconds that the counter reset itself. (R, W) (optional) (2 bytes).

Threshold value for discarded cells due to buffer overflow:

The threshold for the number of cells discarded on this queue due to buffer overflow. (R, W) (optional) (2 bytes).

T-CONT buffer pointer:

This attribute represents the T-CONT buffer instance that is directly associated with this priority queue. Upon autonomous instantiation this attribute consists of the 0x8000, 0x8100 or 0xYY00. 0xYY is the first byte of this Managed Entity id.. (The default value should be decided in consideration of the backward compatibility.) It is used when this priority queue is contained by a T-CONT buffer directly, this pointer is null (0x0000) otherwise. (R, W) (mandatory) (2 bytes).

Traffic Scheduler pointer:

This attribute represents the Traffic Scheduler instance that is directly associated with this priority queue. Upon autonomous instantiation this attribute is null (0x0000). This pointer is used when this priority queue is connected with a Traffic Scheduler. (R, W) (mandatory) (2 bytes).

Weight:

This attribute represents weight for WRR. This weight is used by the Traffic Scheduler or T-CONT buffer (whose Policy is WRR) indicated by the Traffic Scheduler pointer or T-CONT buffer pointer, if present. Upon autonomous instantiation this attribute consists of the 0x01. (R, W) (mandatory) (1 bytes).

Actions

Same as ITU-T G.983.2.

Notifications

Same as ITU-T G.983.2.

7.3.2 Traffic Scheduler

An instance of this managed entity represents a logical object of some Traffic Scheduler to control upstream ATM cells. A Traffic Scheduler can accommodate ATM cells after priority queue or other Traffic Scheduler and transfer ATM cells toward the next Traffic Scheduler or T-CONT buffer.

Relationships

Zero or more instances of this managed entity are contained in an instance of the ONT managed entity.

Attributes

Managed Entity id: This attribute provides a unique number for each instance of this managed entity. This 2-byte number is associated with the physical capability that realizes the Traffic Scheduler. The first byte is the slot id of the PON IF card with which this Traffic Scheduler is associated. For integrated PON IF interfaces, this byte can be associated with "pseudo" slot id 0x80 (128). If the ONT has Traffic Schedulers that are not associated with the PON IF card at the creation of this instance, the first byte of this Traffic Scheduler is 0xFF. The second byte is the Traffic Scheduler id that is numbered by the ONT itself. The Traffic Scheduler id is numbered in ascending order with the range of 0x00 to 0xFF in each PON-IF Line Card or ONT core. (R) (mandatory) (2 bytes).

T-CONT Buffer pointer:

This attribute represents the T-CONT Buffer instance that is directly associated with this Traffic Scheduler. Upon autonomous instantiation this attribute consists of the 0x8000, 0x8100 or 0xYY00. 0xYY is the first byte of this Managed Entity ID. (The default value should be decided in consideration of the backward compatibility.) This pointer is used when this Traffic Scheduler is contained by the T-CONT buffer directly, it is null (0x0000) otherwise. (R) (mandatory) (2 bytes).

Traffic Scheduler pointer:

This attribute represents the Traffic Scheduler instance that serves this Traffic Scheduler. Upon autonomous instantiation this attribute is null (0x0000). This pointer is used when this Traffic Scheduler is connected to another Traffic Scheduler, it is null otherwise. (The default value should be decided in consideration of the backward compatibility.) (R) (mandatory) (2 bytes).

Policy: This attribute represents scheduling policy. Valid values include but are not limited to "Null"(value 0x00), "HOL"(value 0x01) or "WRR"(value 0x02). Upon autonomous instantiation this attribute consists of the 0x00. (R) (mandatory) (1 byte).

Priority/Weight: This attribute represents priority for HOL scheduling or the weight for WRR scheduling. This value is used by the T-CONT buffer or Traffic Scheduler indicated by the T-CONT buffer pointer or Traffic Scheduler pointer. If the indicated pointer has Policy = HOL, then this value is interpreted as a priority (0x00 indicates the highest priority, and 0xFF (255) the lowest). If the indicated pointer has Policy = WRR, then this value is interpreted as a weight. Upon autonomous instantiation this attribute consists of the 0x00. (R, W) (mandatory) (1 byte).

Actions

Get: Get one or more attributes.

Set: Set one or more attributes.

Notifications

Attribute Value

Change: This notification is used to report autonomous changes of attributes of this managed entity. The notification shall identify its new value.

8 ONT management and control channel (OMCC)

See clause 8/G.983.2.

9 ONT management and control protocol

The ONT management and control protocol cell format is defined in ITU-T G.983.2. The specifications of the format are applied to this Recommendation. As new managed entities are introduced into the OMCI specifications, the managed entity identifier that is used in the message identifier field shall be defined. Table 3 gives the class value of the new managed entities.

Table 3/G.983.7 – Managed entity and its class value

Managed entity class value	Managed entity
63	Traffic Scheduler
64	T-CONT Buffer
65..255	Reserved

Other specifications are referred to clause 9/G.983.2.

Appendix I

DBA related sequence scenario

In this appendix, DBA related sequence are shown.

I.1 Initial handshake

The scope of initial handshake is from ranging to acquisition of the information to be able to start the status reporting. Allocation of the divided_slot grant and data grants and T-CONT configuration is described in clause I.2, Addition of T-CONT.

Figure I.1 shows the initial handshake procedure.

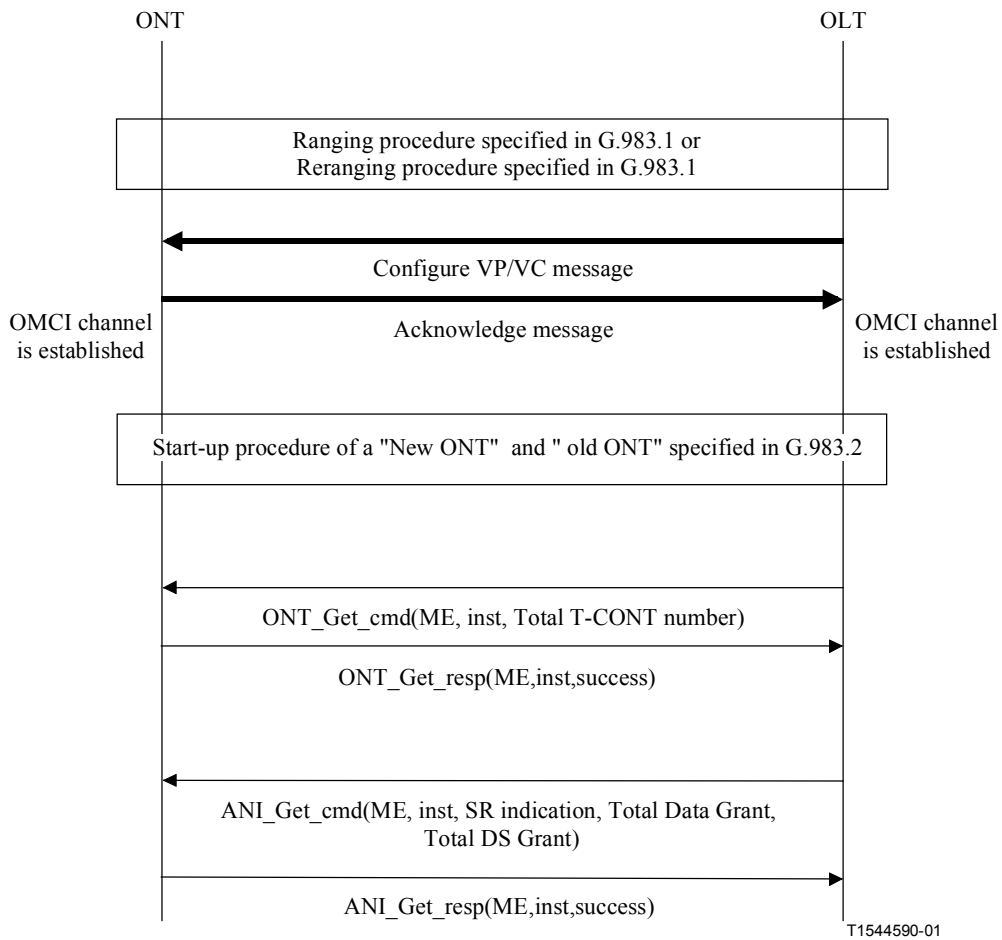


Figure I.1/G.983.7 – Initial handshake procedure

I.2 Addition of T-CONT in an ONT

Figure I.2 shows the addition of T-CONT.

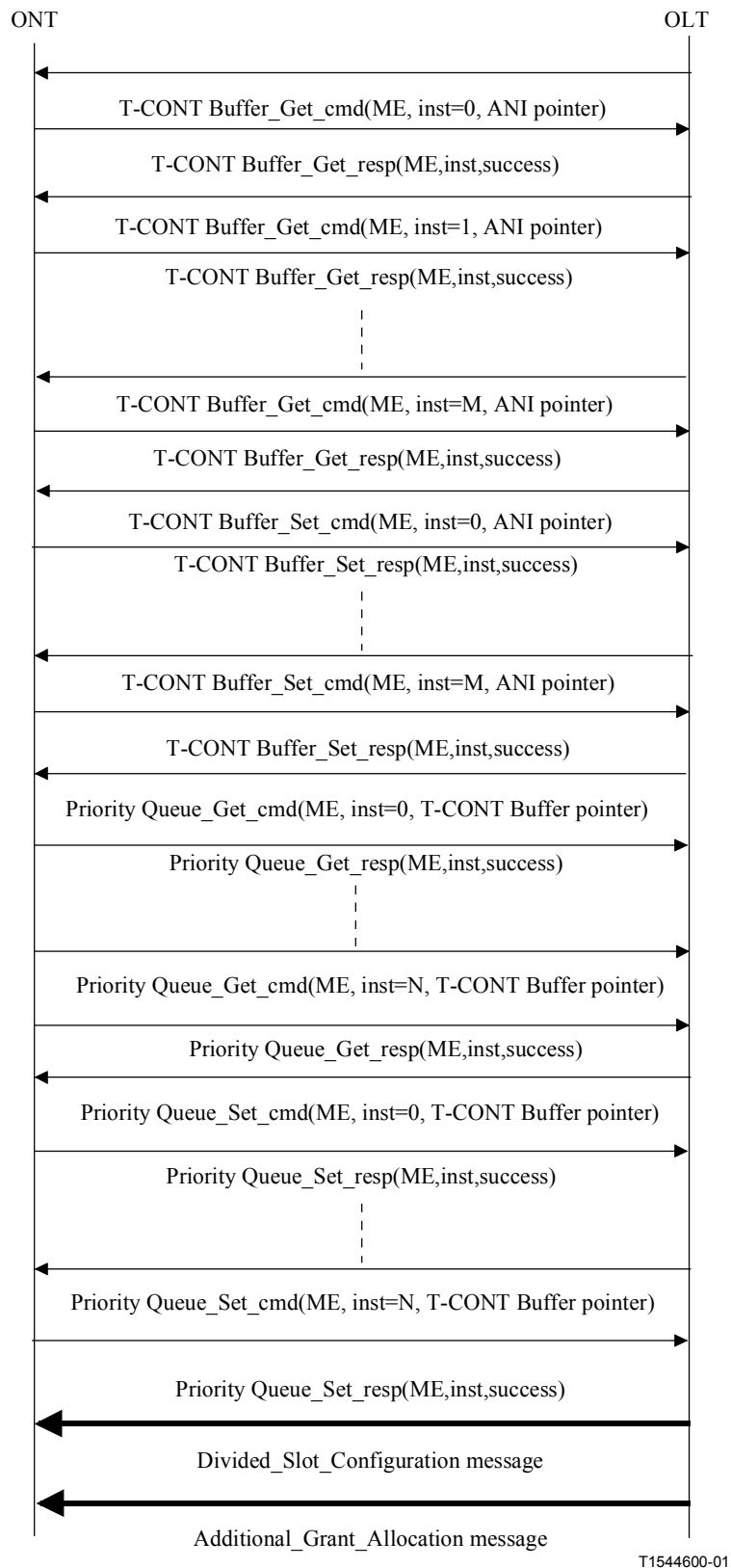


Figure I.2/G.983.7 – T-CONT addition procedure

I.3 Deletion of T-CONT in an ONT

Figure I.3 shows the deletion of T-CONT.

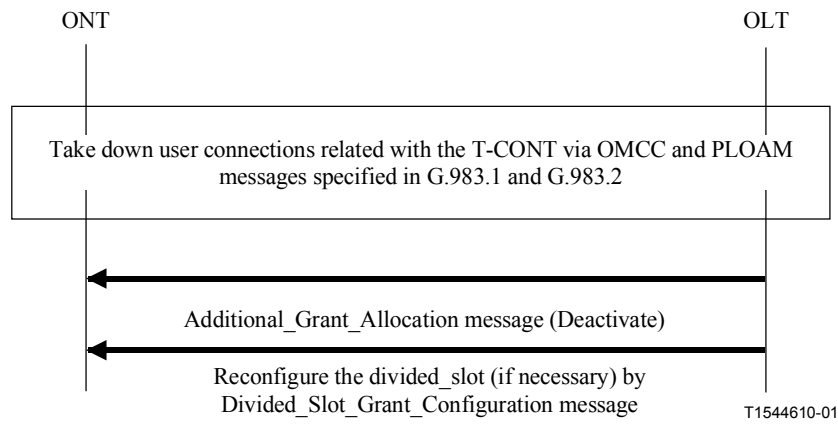


Figure I.3/G.983.7 – Deletion of T-CONT

Appendix II

An example of the Traffic Scheduler configuration

An example of the configuration of the Traffic Scheduler is proposed in Figure II.1. This model consists of three stages, such as 2 delay control and 1 guaranteed rate control stages. A delay control stage can be worked by HOL (Head Of the Line) scheduling. A guaranteed rate control stage can be worked by WRR.

There are two operations using the above model, such as delay prioritized and guaranteed prioritized policies. These configurations are shown in Figures II.2 and II.3.

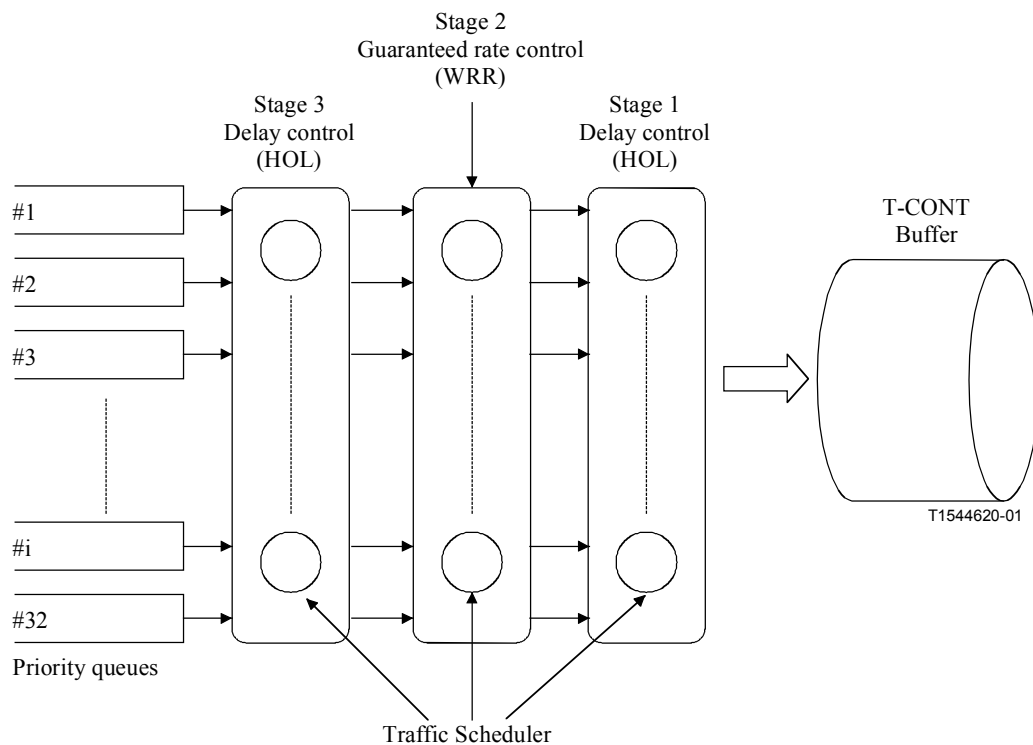


Figure II.1/G.983.7 – Architectural model in ONT

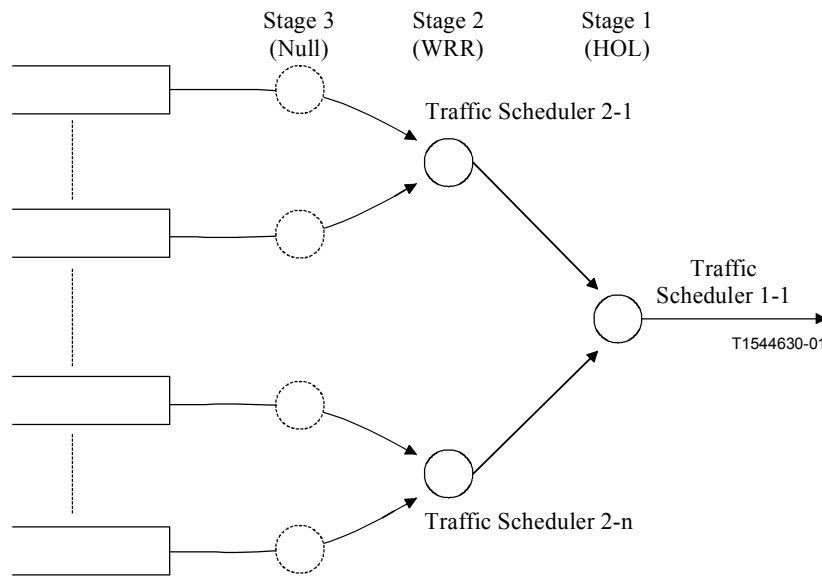


Figure II.2/G.983.7 – Configuration of delay prioritized model

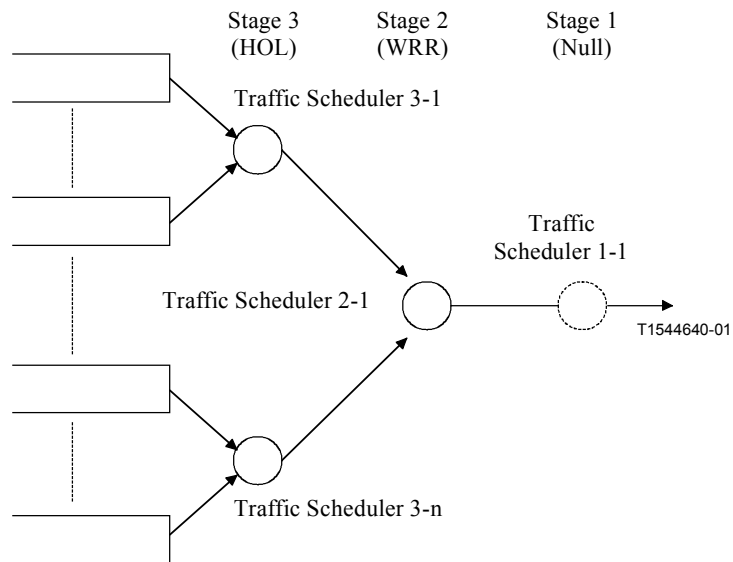


Figure II.3/G.983.7 – Configuration of guaranteed rate prioritized model

SERIES OF ITU-T RECOMMENDATIONS

Series A	Organization of the work of ITU-T
Series B	Means of expression: definitions, symbols, classification
Series C	General telecommunication statistics
Series D	General tariff principles
Series E	Overall network operation, telephone service, service operation and human factors
Series F	Non-telephone telecommunication services
Series G	Transmission systems and media, digital systems and networks
Series H	Audiovisual and multimedia systems
Series I	Integrated services digital network
Series J	Cable networks and transmission of television, sound programme and other multimedia signals
Series K	Protection against interference
Series L	Construction, installation and protection of cables and other elements of outside plant
Series M	TMN and network maintenance: international transmission systems, telephone circuits, telegraphy, facsimile and leased circuits
Series N	Maintenance: international sound programme and television transmission circuits
Series O	Specifications of measuring equipment
Series P	Telephone transmission quality, telephone installations, local line networks
Series Q	Switching and signalling
Series R	Telegraph transmission
Series S	Telegraph services terminal equipment
Series T	Terminals for telematic services
Series U	Telegraph switching
Series V	Data communication over the telephone network
Series X	Data networks and open system communications
Series Y	Global information infrastructure and Internet protocol aspects
Series Z	Languages and general software aspects for telecommunication systems