ITU-T SG13 국내기고서(16편)

ITU-Telecommunication Standardization Sector

Study Group 13
Geneva, 7-18 March 1994

Delayed Contribution No. D.

Document addressed to : WP 2/13

Question(s) : 7/13

SOURCE : 대한민국

제목 : 점 대 다중점 연결에 있어서 F5 OAM 셀을 이용한 VCC 루프백 검사

요약 :

본 기고서는 점 대 다중점 VC 연결에 있어서 F5 OAM 셀을 이용한 루프백 검사를 제안한다. 다중 연결점에서는 루트 점에서 보낸 검사용 OAM 셀의 PTI 값을 변경한 후 그 셀 들을 복사하여 다중점으로 전송한다. 또한 연결점은 루프백되는 셀들을 검사하여 다중점 연결의 동작을 검사하여 이상이 없을 시에 루트점에 루프백 셀을 보내게 된다.

ITU-Telecommunication Standardization Sector

Study Group 13
Geneva, 7-18 March 1994

Delayed Contribution No. D.

Document addressed to : WP 2/13

Question(s) : 7/13

SOURCE : KOREA(REPUBLIC OF)

TITLE : VCC LOOPBACK TEST FOR POINT-TO-MULTIPOINT CONNECTION USING F5 OAM CELLS

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ABSTRACT

This contribution proposes the loopback test for point-to-multipoint VC connection using F5 OAM cells. It proposes that the multipoint connecting point copy and forward the loopback OAM cell from the root node with the PTI value modified. The connecting point also monitors the loopback cells and determines the VC availability of the multiple connections, and finally sends a loopback OAM cell to the root.

Ⅰ. INTRODUCTION

VCC loopback test is one of the OAM functions for the VCC (F5 Flow) defined in Rec. I.610. The loopback cells are sent and looped back to check VC availability in the point-to-point VC connection. In the point-to-multipoint VC connection, multiple loopback cells are returened for a single loopback test, which makes it difficult to detect the VC availability of the multiple users. To handle this case, a proper method should be devised by modifying current loopback OAM operation.

This document proposes a method to detect the availability of the point-to-multipoint VC using F5 loopback OAM function.

Ⅱ. LOOPBACK TEST IN THE POINT-TO-MULTIPOINT VC CONNECTION USING F5 OAM FUNCTION

A point-to-multipoint virtual channel connection is shown in Fig 1, where A is a CEP working as a root node, C1-C4 are CEPs or CPs working as leaf nodes. There is a point-to-multipoint connection between A and C1-C4. B is a VC connecting point which copies the data from A and forwards to C1-C4. To determine the VC availability between B and C1-C4, a certain method should be provided.

We propose that F5 loopback OAM cells be used to detect the point-to-multipoint VC availability, and that the connecting point B have a proper function to handle the F5 OAM loopback cells.

The first octet of the OAM cell information field constists of four bits of OAM TYPE and 4 bits of FUNCTION TYPE. For the VCC loopback test, OAM TYPE is fault management(0001) and FUNCTION TYPE is loopback(1000). When the F5 loopback OAM cell is sent from the root node (A), the PTI value is 101(end-to-end). When the loopback OAM cell passes the VC connecting point (B), the cell is copied and forwarded to all the leaf nodes with their PTI values modified to

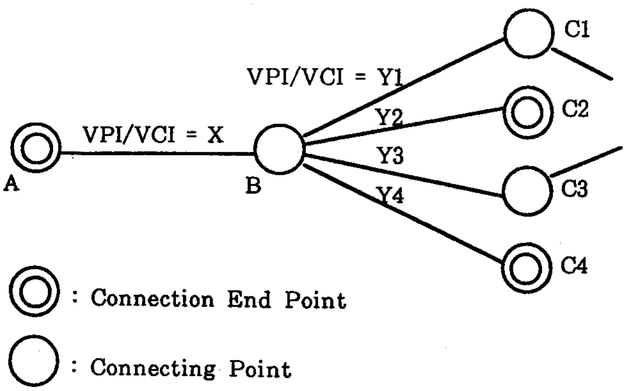

Fig 1 : Point-To-Multipoint VC Connection

100(segment). On detecting the segment loopback OAM cells, all the leaf nodes return the loopback OAM cells. When the connecting point (B) receives the same number of loopback cells as it sent, it sends a loopback OAM cell with PTI=101 (end-to-end) to A noticing that all the multiple VCs are available. This procedure is shown in Fig. 2. In Fig. 2-1), the root node A sends a F5 loopback OAM cell with PTI=101, the cell is copied and forwerded to all the leaf nodes with PTI=100. All the cells are looped back to the connecting point (B) and finally looped back to the root node A indicating the availability of the multiple VCs. Fig. 2-2) shows that B-C2 channel is not available. In this case, the loopback cell does not return from C2 node. The connecting point B notices the failure and sends no loopback cell to the root node (A). With this procedure, the root node (A) is informed that one or more of the multiple VCs are not available and takes a proper action.

3. CONCLUSIONS

The loopback test using F5 OAM cells in proposed for point-to-multipoint VC connection. At the VC connecting point, the received end-to-end F5 loopback OAM cell is modified to a segment F5 loopback OAM cell by changing the PTI value. The modified F5 loopback OAM cells are forwarded to all the leaf nodes. According to the loopbacks from the leaf node, the connecting point determines the availability of the multiconnection VCs, and sends a loopback cell to the root node if all the virtual channels are available.

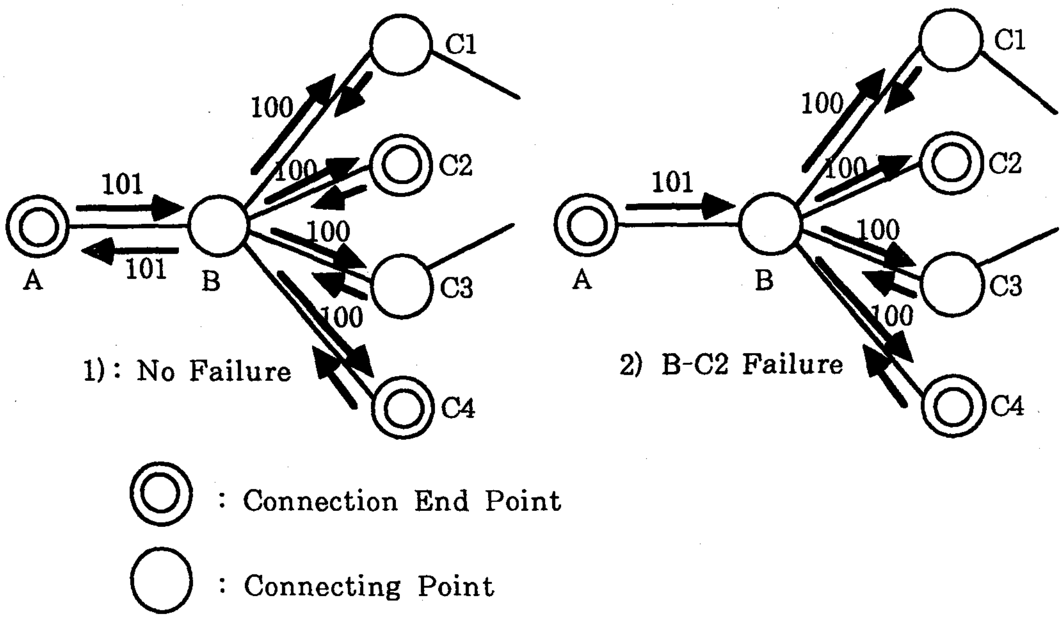

Fig 2 : Point-To-Multipoint VCC Loopback Test

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Study Group 13 Delayed Contribution No. D.
Geneva, 7-18 March 1994

Document addressed to : WP 2/13

Question(s) : 7/13

SOURCE : KOREA(REPUBLIC OF)

TITLE : ATM LAYER OAM CELL FORMAT USING CRC-32 INSTEAD OF CRC-10

I. Discussion

At the last SG11 meeting (May, 1993), the Meta-signaling group agreed to use CRC-32 for the meta-signaling message instead of CRC-10. That is to share the same CRC mechanism with SAAL which also uses AAL Type 5 with CRC-32.

The ATM layer OAM and the meta-signaling have several aspects in common: 1) Both protocols exist in the ATM layer managements. 2) Each message of these protocols is composed of only one cell. Figure 1 shows common fields to all types of OAM cells. 3) Both message formats have many unused octets. Figure 2-Figure 5 show specific fields including the unused octets for each OAM cell type. Accordingly in order to avoid the different hardware implementation, it is necessary to consider the use of CRC-32 for the ATM layer OAM cell format.

Header	OAM Type	Function Type	Function Specific Field	res. fut. use	EDC (CRC-10)
5 octets	4 bit	4 bit	45 octets	6 bit	10 bit

Figure 1. Common OAM Cell Format

Failure Type (opt.)	Failure Location (optional)	Unused
1 octets	FFS(octets)→12 octets	FFS(octets)→32 octets

Figure 2. Specific Fields for AIS/FERF Fault Management Cell

Loopback Indication	Correlation Tag	Loopback Location ID	Source ID	Unused
1 octets	4 octets	12 octets	12 octets	16 octets

Figure 3. Specific Fields for Loopback Cell

MSN	TUC	BIP-16	TS (opt.)	Unused	Block Error Result	Lost/ Misinserted Cell Count
1 octets	2 octets	2 octets	4 octets	33 octets	1 octets	2 octets

Figure 4. Specific Fields for Performance Management Cell

Message ID	Directions of Action	Correlation Tag	PM Block Sizes A-B	PM Block Sizes B-A	Unused
6 bit	2 bit	8 bit	4 bit	4 bit	42 octets

Figure 5. Specific Fields for Activation/Deactivation Cell

Ⅱ. Proposal

The proposed common OAM cell format using CRC-32 shown in figure

Header	OAM Type	Function Type	Function Specific Field	EDC (CRC-32)
5 octets	4 bit	4 bit	43 octets	4 octets

Figure 6. Proposed Common OAM Cell Format

Also, section 7.1/I.610 should be amended as follows

(5) Error Detection Code (4 octets) -this field carries a CRC-32 error detection code computed over the information field of the OAM cell. The CRC-32 generationg polynomial is:

$$G(x) = x^{32}+x^{26}+x^{23}+x^{22}+x^{16}+x^{12}+x^{11}+x^{10}+x^{8}+x^{7}+x^{5}+x^{4}+x^{2}+x+1$$

ITU-Telecommunication Standardization Sector

Study Group 13 Delayed Contribution No. D.
Geneva, 7-18 March 1994

Document addressed to : WP 2/13

Question(s) : 6/13

SOURCE : KOREA(REPUBLIC OF)

TITLE : Proposal to study COTS first

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I. INTRODUCTION

In the January '93 WP XVIII/8 meeting and contributions to July '93 meeting, it was agreed to study a sscs (SSCF) to support connection oriented OSI network Service(CONS) and Transport Service(COTS) together, leaving the question of priority for this study to be decided by future contributions.

Examples of existing applications like message oriented transfer information service (MOTIS) and message handling system (MHS) utilizes OSI transport services. Although existing transport layer protocol colud work over network layer services provided by a sufficient AAL, transport service provided directly by AAL would be more efficient and could provide higher performance.

Considering that in a broadband environment lean protocol stacks with as few mechanisms as possible are definitly advantageous, the goal should be to specify the highest OSI connection-oriented service that can easily be rendered on the basis of SSCOP.

From the perspective of end users, the transport functions at the terminal equipments should be implemented at the earliest stage, providing the connections between application programs. In this way, providing the connections between end points helps to realize B-ISDN earlier by making most use of the strong points of B-ISDN.

2. CONCLUSIONS

Consequently, Korea proposes that the standardization of the connection-oriented transport services(COTS) to be studies first from the viewpoints of the implementation of the fewer types of protocols, the efficienct protocol processing, and the early introduction of B-ISDN.

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Study Group 13 Delayed Contribution No. D.
Geneva, 7-18 March 1994

Document addressed to : WP 3/13

Question(s) : 13/13

SOURCE : KOREA (REPUBLIC OF)

TITLE : 155Mbit/s미만 저속 S_B 및 T_B 인터페이스의 Bit Rate 제안

요약 :

'93년 7월 회의에서 합의한 155Mbit/s미만의 저속 S_B 인터페이스에 대한 제한 사항인 거리 100m, 점대점 연결 그리고 전기적 인터페이스를 고려하고 또한 초기 B-ISDN망의 보급을 위하여 수용 서비스 대 가격 경쟁력에서 유리한 17.280Mbit/s(net rate : 16.128Mbit/s)를 저속 S_B 인터페이스 Bit rate로 제안한다. 또한 저속 T_B 인터페이스의 Bit rate로는 51.840Mbit/s를 제안한다.

ITU-Telecommunication Standardization Sector

Study Group 13 Delayed Contribution No. D.
Geneva, 7-18 March 1994

Document addressed to : WP 3/13

Question(s) : 13/13

SOURCE : KOREA(REPUBLIC OF)

TITLE : Bit Rate for S_B and T_B Interfaces less than 155.52 Mbit/s

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ABSTRACT
This contribution proposes 17.280Mbit/s(net rate : 16.128Mbit/s) for the S_B interface less than 155.52Mbit/s. We also propose 51.840Mbit/s for the lower T_B interface.

1. INTRODUCTION

At the meeting of July 1993, it was agreed that the S_B interface less than 155.52Mbit/s would be first requested the proposal for the point-to-point connection within 100 meter and an electrical interface.

To discuss the bit rate for the S_B interface less than 155.52Mbit/s, the following points would be taken into considerations;simple integration of the digital transmission hierarchy, the transmission cable, the foreseeable service bandwidth for the end customer equipments, the system life cycle of the S_B interface less than 155.52Mbit/s, the future demand for transmission distance longer than 100 meter, line coding, and the cost-effectiveness.

Based on these considerations, we consider the bit rate by comparing the other proposal including ATM forum and IEEE standards, Then, we conclude that 17.280Mbit/s would be acceptable for the S_B interface less than 155.52Mbit/s, which was suggested at the meeting of July 1993 in Korea[1]. In addition, we also propose the 51.840Mbit/s, for the bit rate of the T_B interface less than 155.52Mbit/s[2]~[4].

2. DISCUSSIONS FOR THE S_B INTERFACE LESS THAN 155.52 Mbit/s

The bit rate for the S_B interface less than 155.52 Mbit/s was mainly discussed at July 1993 into these categories;17.280Mbit/s(net rate:16.128Mbit/s, by Germany and Korea) and 51.840Mbit/s (by U.S.A and Canada). In addition, 24.192Mbit/s was suggested by Germany, which could be compared with 25 Mbit/s proposed by IBM at ATM forum[5]![7]. Now, we discuss the following points.

– transmission hierarchy
  17.280Mbit/s and 51.840Mbit/s could be simply multiplexed into the STM-1 frame structure. But, 25 Mbit/s could be integrated into the STM-1 only by delimiting the ATM cell format.

– transmission cable characteristics
  all the candidates bit rate could be acceptable for the distance within 100 meter by using the un-shielded twisted pair (UTP) cable which is in the category 3 of ANSI/EIA/TIA 568[8]~[9].

– foreseeable service bandwidth
  For the foreseeable service perspectives, the net rate of 16.128Mbit/s could be acceptable to provide the existing television signals(e.g., NTSC, PAL, SECAM), the multimedia end user equip-

ments, the digital television signaling when the appropriate compression techniques are utilized like MPEG-2.

– system life cycle of the electric S_B interface less than 155.52Mbit/s

When we consider the cross-over point between the electric interface and the optical interface, we expect that the bit rate of 17.280Mbit/s is esnough to the foreseeable future service bandwidth.

– future demand for transmission distance longer than 100 meter

For some application in the future, we couldn't avoid the to provide the transmission longer than 100 meter for the geographical coverage of the certain services. To cope to these situations, 17.280Mbit/s is more flexible than 51.840Mbit/s without changing the cable.

– line coding

There are many candidate coding schemes to support the S_B interface less than 155.52Mbit/s for the pre-assumed service environment. To choose the proper coding scheme, it is significant to consider the processing cost of line coding.

– cost-effectiveness

Finally, it expects that there will be very many competitive solutions to provide the customer access to the public network. It means that the S_B interface less than 155.52Mbit/s will be one of the possible solutions. Then, we assume that the S_B interface less than 155.52Mbit/s will only have the cost-effectiveness at the early stage of B-ISDN deployment.

3. PROPOSAL FOR THE T_B INTERFACE LESS THAN 155.52Mbit/s

With the similar discussion points, we propose 51.840Mbit/s for the T_B interface less than 155.52Mbit/s. The proposed bit rate could be simply multiplexed into the STM-1 frame. Also, The lower S_B interfaces could be easily integrated to the proposed T_B interface less than 155.52Mbit/s. To cover the longer distance than 100 meter, the UTP cable could be changed by the shield transmission cable or the low cost optical cales. Fig. 1 shows the integration structure of the proposed S_B and T_B interfaces less than 155.52Mbit/s.

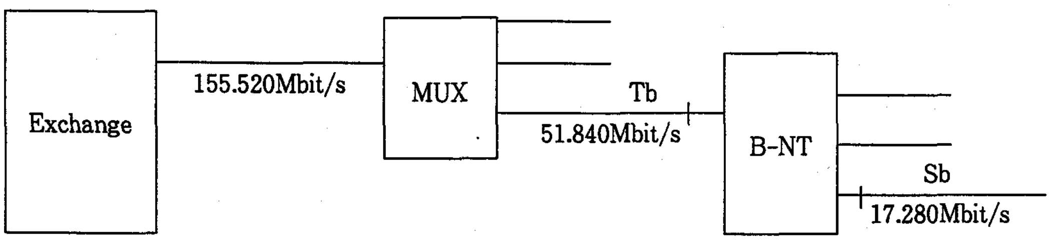

Fig.1 The integration structure of the proposed S_B and T_B interfaces less than 155.52Mbit/s

4. CONCLUSIONS

We proposed 17.280Mbit/s (net rate ; 16.128Mbit/s) for the S_B interface less than 155.52 Mbit/s and 51.840Mbit/s for the lower T_B interface in some discussion points such as transmission hierarchy, electric cable, service bandwidth, system life cycle, line coding, and cost-effectiveness.

References

[1] D.192, "bit-rate calculation for S_B/T_B interface at the bit rate less than 155.52Mbit/s" Geneva, ITU-T SG13, 5, 5-16 July, 1993.
[2] ATM-Forum/93-600, "AM/PM Modulation for UTP-3," ATM forum, 8-11 Sept. 1993
[3] ATM-Forum/93-646, "The 16-CAP Encoding Scheme and Its Application to the ATM UTP-3 UNI at 51.84Mb/s" ATM forum, 19-21 May. 1993
[4] ATM-Forum/93-835, "51.84Mbit/s BPRIV Transceiver for Transmission over 200m UTP-3 and German Cables" ATM forum, 8-11 Sept. 1993.
[5] ATM-Forum/93-436, "ATM Applications Analysis" ATM forum, 19-21 May. 1993
[6] ATM-Forum/93-559, "25Mbps to the Desktop Now" ATM forum, 14-16 April. 1993
[7] ATM-Forum/93-776R1, "ATM Forum White Paper on 25Mbit UTP-3" ATM forum, 27-29 July. 1993
[8] ATM-Forum/93-615, "UTP-3 Requirements/Criteria Status" ATM forum, 19-21 May. 1993
[9] ATM-Forum/93-664, "A Transceiver for UTP-3 should be scalable" ATM forum, 19-21 May. 1993

ITU-Telecommunication Standardization Sector

Study Group 13 Delayed Contribution No. D.

Geneva, 7-18 March 1994

Document addressed to : WP 2/13

Question(s) : 8/13. 26/13

SOURCE : KOREA (REPUBLIC OF)

TITLE : I.150, I.350 및 I.371에서 QOS 등급 정의

요약 :

본 기고서에서는 I.150, I.350, I.371에서 사용되는 QOS 등급의 정의에 대하여 제안한다. 상기한 권고안에서 QoS와 관련된 사항을 비교한 결과 ATM 연결에 대한 QoS 정의를 명확히 할 필요가 있다. 이를 위해 본 기고서에서는 ATM 포럼의 자료를 근거로 QoS 등급을 규정된 QoS 등급과 규정되지 않은 QoS 등급의 두 단계로 나누어서 정의할 것을 제안한다.

ITU-Telecommunication Standardization Sector

Study Group 13 Delayed Contribution No. D.

Geneve, 7-18 March 1994

Document addressed to : WP 2/13

Question(s) : 8/13, 26/13

SOURCE : KOREA (REPUBLIC OF)

TITLE : CLARIFICATION OF DEFINITIONS OF QUALITY OF SERVICE CLASS IN I.150, I. 350, AND I.371

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ABSTRACT

This contribution proposes the clarification of definitions of Quality of Service (QoS) classes in I. 150, I.350, and I.371. By comparing the expression of the QoS in I.150, I.350, and I.371, it should be clarified the definitions of the QoS classes for the ATM connection. Then, we propose that the Qos classes are divided into two categories; the Specified QoS Classes and Unspecified QoS Classes, which are based on the ATM forum UNI specifications.

1. INTRODUCTION

In a definition of Quality of Service (QoS) in I.150, the QoS is described in relation to VPC, VCC, and CLP. In I.350, the QoS is expressed by parameters from the user's point of view. In I.371, the QoS is defined for the ATM Layer service and is expressed by the traffic control, call/connection, and resource parameters. In these different views. it should be clarified to define the QoS class for the ATM connection. It should be also clarified to define the ATM Layer QoS class and AAL Layer QoS class.

In I.150, it is described that the QoS is related to virtual channel connections (VCCs), virtual path connections (VPCs), and the cell loss priority (CLP). Specific QoS classes related to VCCs and VPCs are remained for further study. It is stated that the QoS classes related to the CLP could have two different classes.

In E.800 (Blue book), the QoS is defined that "Collective effect of service performances which determine the degree of satisfaction of a user of the service". In I.350, it is stated that "the QoS is characterized by the combined aspects of:

– service support and service operability performance, and
– service ability and service integrity performance."

Also, it is stated that "the aspects of Quality of Service are restricted to the identification of parameters that can be directly observed and measured at the point at which the service is accessed by the user. Other types of Qos parameters will not be specified in the I-Series Recommendations on QoS. From a user's point of view, Quality of Service is best expressed by parameters which

– focus on user-perceivable effects, rather than their causes within the network;
– do not depend, in their definition, on assumptions about the network internal design;
– take into account all aspects of the service from the user's point of view which can be objectively measured at the service access point;
– may be assured to a user at the service access point by the service provider(s);
– are described in the network independent terms and create a common language understandable

by both the user and the service provider."

In I.371, it is stated that "ATM layer Traffic Control and Congestion Control should support a set of ATM layer QoS classes sufficient for all foreseeable B-ISDN services ; the specification of these QoS classes should be consistent with network Performance at present under study."

It is also stated that "For the single ATM connection, a user indicates at most two QoS classes from the QoS classes which the network provides, only differing by the Cell Loss Ratio. Specific QoS classes are the subject for further study." and "It is the role of the upper layers, including the AAL, to translate this ATM Layer QoS to any specific application requested Qos."

By comparing the Recommendations I.150, I.350, and I.371, the QoS is expressed by the different point of views of user service, traffic, connection within a call, and performance. Some interpretations may cause errors since the QoS classes remain for further study.

2. PROPOSED CLARIFICATION OF QoS CLASS DEFINITIONS

It summarizes the key issues to be clarified in I.150 and I.371. In I.150, the ATM Layer connection has at most two QoS classes by the CLP bjectives. ATM layer QoS classes should be defined for ATM layer Traffic Control and Congestion Control in I.371. It requests that the specific QoS classes should be defined to avoid the unnecessary confusion. In addition, the role of the AAL layers is to translate this ATM Layer QoS to any specific application requested QoS.

Then, we propose the QoS class for the ATM connection based on the ATM forum UNI specifications into two categories ; the Specified QoS Classes and the Unspecified QoS Classes [1]. The Specified QoS Classes had been suggested by ATM forum:

- Specified QoS Class 1 : support a QoS that will meet Service Class A performance requirements
- Specified QoS Class 2 : support a QoS that will meet Service Class B performance requirements
- Specified QoS Class 3 : support a QoS that will meet Service Class C performance requirements
- Specified QoS Class 4 : support a QoS that will meet Service Class D performance requirements

As for the Unspecified QoS Classes, no objective is specified for the performance parameters. However, the network provider may determine a set of internal objectives for the performance parameters. Then, we suggest the following unspecified QoS classes for the internal performance objectives of the ATM connection:

- Unspecified QoS Class 1 : support a QoS that will meet timing sensitive connection performance requirements
- Unspecified QoS Class 2 : support a QoS that will meet loss sensitive connection performance requirements

- Unspecified QoS Class 3 : support a QoS that will meet delay sensitive connection performance requirements
- Unspecified QoS Class 4 : support a QoS that will meet delay-tolerant connection performance requirements

As for the informations for the classification of Unspecified QoS Classes, the network provider may have the reference values of performance parameters in terms of timing, loss, and delay for the ATM connections. In an example case that a network element should provide better timing, performance than the reference value to satisfy the user requirements, the Specified QoS Class 1 service could be provided by the connection with the Unspecified Qos Class 1 performance according to the internal performance objectives. An example application of the Unspecified QoS class 4 is the support of "best effort" service[1].

In addition, the CLP bit could be used to provide the two levels of the Unspecified QoS classes. In an example application, the network operator may provide the two levels of the Unspecified QoS Class 2 with CLP=0 and CLP=0+1.

References

[1] ATM User-Network Interface Specification Version 3.0, September 10, 1993.

ITU-Telecommunication Standardization Sector

Study Group 13 Delayed Contribution No. D.
Geneva, 7-18 March 1994

Document addressed to : WP 1/13

Question(s) : 2/13

SOURCE : KOREA (REPUBLIC OF)

TITLE : B-ISDN 번호계획을 위한 E.164에서 다이나믹 어드레스 필드할당.

요약 :

본 기고서에서는 B-ISDN 번호계획을 위한 다이나믹 어드레스 필드할당을 제안한다. 여기서는 E.164 번호 필드 중 마지막 4 디지트를 다이나믹 어드레싱을 위한 영역으로 사용할 것을 제안한다. 다이나믹 어드레싱은 분배서비스, 사용자 어드레스 그룹, 논리적 어드레싱 및 사설번호계획에서 사용될 수 있는 기존과는 다른형태의 루팅 방식을 선택하는데 사용한다.

ITU-Telecommunication Standardization Sector

Study Group 13 Delayed Contribution No. D.
Geneva, 7-18 March 1994

Document addressed to : WP 1/13

Question(s) : 2/13

SOURCE : KOREA (REPUBLIC OF)

TITLE : DYNAMIC ADDRESS FIELD ALLOCATION IN E.164 FOR B-ISDN NUMBERING AND ADDRESSING PLAN

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ABSTRACT

This contribution proposes the dynamic address field allocation of E.164 for B-ISDN numbering and addressing plan. It proposes that the last four digits in E.164 are allocated for the dynamic addressing. The dynamic address field would by used for an selection of different routing policies as in the case of the multi-cast service, user address grouping, logical addressing, and private numbering plan, etc.

1. INTRODUCTION

E.164 numbering plan should provide the identification of B-ISDN services according to routing domain and tele-service type. It could also support various connection types including the multi-party/multi-point multi-connection and multi-media service. The multi-point and multi-cast connection capability would be very useful for the national-area user grouping services like the information exchange within the closed user group. It needs the differnt addressing scheme depending on the routing domain.

It may require the additional addressing capacity to provide the dynamic addressing mechnaism adding to the physical E.164 numbering plan [1]. The numbering plan for the multi-point and multi-cast connections have been studied both in the public and private domain. The important issues of B-ISDN numbering and addressing requirements could be given as follows.

- support of various connection types including multi-point and distribution connections
- support of national-area user and service grouping
- Support of private numbering plan by using their own addressing schemes

Based on these requirements. this contribution proposes that the dynamic address field on the E.164 numbering plan should be assigned for an selection of dynamic routing policies for the multi-point/multi-cast connection, user grouping, logical addressing, and private numbering plan, etc.

2. DYNAMIC ADDRESS FIELD ALLOCATION FOR B-ISDN NUMBERING AND ADDRESSING PLAN

It notes that E.164 numbering plan is based on the physical topological configuration at the public network access point and the location of routing node. For the B-ISDN numbering requirements, we consider the followings points;

- multi-party/multi-point connection

The multi-party/multi-point connection capability could support the high-level distribution services with the appropriate addressing fields. The root node could communicate to all the leaf nodes with only a small number of addressing field.

—user group address

The group address could be allocated for the users joining the special value-added services. User group address could also be defined as in an example of wide-area centrex service. The group numbering plan for the national-area distribution service could be defined as in case of newspaper distribution and cable TV distribution.

—private numbering plan

B-ISDN numbering plan may be helped for the addressing and routing of private-domain customer premise network such as IEEE MAC and ISO NSAP address [2].

When we consider the B-ISDN numbering plan, we propose that the 64bits address field of existing E.164 plan is divided into the main part and the dynamic address part as shown in Fig. 1. The main address part is used to select the geographically fixed area which is assigned based on the subscription. The remained four digits would assigned for the dynamic addressing. It is used for an selection of dynamic routing policies in which the routing rule is different from that of the geographically fixed domain. It could apply for multi-party/multi-point connection, user grouping, logical addressing, and private numbering plan. The dynamic addressing could be done by accessing the address database such as name server within the geographically fixed addressing area. The address database would be updated with on-demand basis. In order to decide the length of dynamic address field of 4 digits, the following points would be taken by

—dimensioning of dynamic routing domain

—address resolution mechanism

—implementation of dynamic routing node

—limitation of local database sizes

—harmony with the private numbering plan such as IEEE MAC and ISO NSAP address[2].

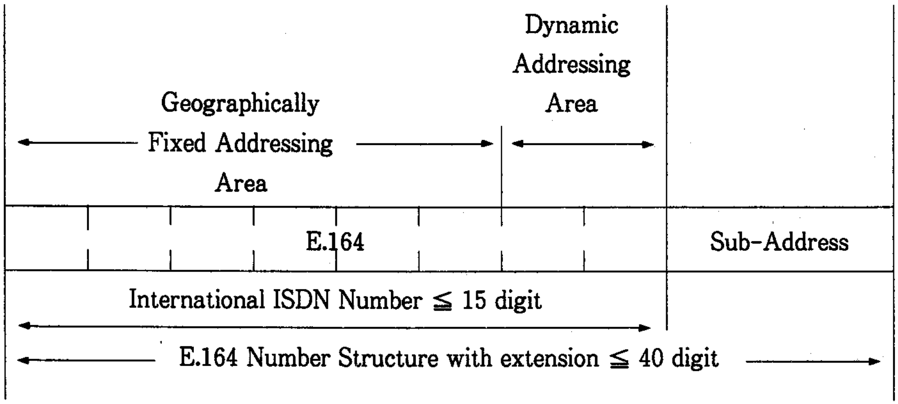

Fig 1 Dynamic addressing field allocation of E.164 number structure

3. CONCLUSIONS

The dynamic address field allocation in E.164 numbering plan are proposed for B-ISDN numbering and addressing plan. We propose that the 64-bits address field of existing E.164 is divided into the main part (12 digits) and the dynamic address part (4 digits). The main address part is used to select the geographically fixed area which is assigned based on the subscription. The dynamic address part is used for an selection of dynamic routing policies as for multi-point/multi-cast connection, user grouping, logical addressing, and private numbering plan. The length of dynamic address field is allocated to the last four digits in E.164.

References

[1] D.185, "sub-address field allocation in E.164 for B-ISDN numbering and addressing plan," Geneva, 5-16 July, 1993.

[2] ATM User-Network Interface Specification Version 3.0, September 10, 1993.

ITU-Telecommunication Standardization Sector

Study Group 13 Delayed Contribution No. D.

Geneva, 7-18 March 1994

Document addressed to : WP 2/13

Question(s) : 7/13, 8/13

SOURCE : KOREA (REPUBLIC OF)

TITLE : ATM 트래픽 혼잡 제어를 위한 OAM셀 형태 제안

요약 :

이 기고서는 관련 기고서 "OAM 셀을 이용한 트래픽 혼잡 제어 제안," 에서 제안한 reactive 혼잡 제어 기능으로서의 EBCN을 지원하기 위한 OAM셀의 형태 구분자를 정의하고 표준안으로 제안한다.

ITU-Telecommunication Standardization Sector

Study Group 13 Delayed Contribution No. D.

Geneva, 7-18 March 1994

Document addressed to : WP2/13

Question(s) : 7/13, 8/13

SOURCE : KOREA(REPUBLIC OF)

TITLE : Proposal of OAM cell type identifier for congestion control

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ABSTRACT

This contribution proposes OAM cell type and function type to be used for ATM congestion control. This contribution should be discussed with the companion contribution "Proposal of ATM congestion control using OAM cells,"D.__________.

1. INTRODUCTION

Traffic control and resource management using OAM cells remain as a further research item in I.371 Our companion contribution proposes the use of OAM cells for EBCN function.

In ATM layer, the OAM flows (F4 and F5) are bidirectional, so OAM cells can be used for EBCN from the intermediate node to the source CEQ when congestion occured. The mechanism by which a network element determines whether it is congested is an implementation issue and is not subject to standardization.

In I.610 common OAM cell format has been defined in FIGURE 8/I.610 and some OAM type identifiers have been defined in Table 4/I.610.

Our companion contribution "Proposal of OAM congestion control using OAM cells, "D.__________ proposes the use of OAM cells for congestion control in ATM layer, For this purpose, the OAM type needs to be defined.

2. PROPOSAL FOR OAM TYPE IDENTIFIERS FOR TRAFFIC CONTROL

Our contribution proposes the extension of Table 4/I.610 as follows

Table 4/I.601

OAM Type	4bit	Function Type	4bit
Fault Management	0001	AIS	0000
	0001	FERF	0001
	0001	Continuity Check	0100
Performance Management	0010	Forward Monitoring	0000
	0010	Backward Monitoring	0001
	0010	Monitoring & Reporting	0010
Activation/Deactivation	1000	Performance Monitoring	0000
		Continuity Check	0001
Congestion Control	0100	EBCN	0100

3. CONCLUSIONS

We proposed the OAM identifier for traffic control, The EBCN generation condition, the generation frequency, and EBON release condition for F4 flow and F5 flow need further study and the related modification of recommendation I.610 also needs further study.

References

[1] ITU-TS, I.371 "Traffic Control and Congestion Contorl".
[2] ITU-TS, I.610 "B-ISDN operation and maintenance principles and functions"

ITU-T SG13 국내기고서(16편)

ITU-Telecommunication Standardization Sector

Study Group 13 Delayed Contribution No. D.
Geneva, 7-18 March 1994

Document addressed to : WP 2/13

Question(s) : 7/13, 8/13

SOURCE : KOREA (REPUBLIC OF)

TITLE : OAM 셀을 이용한 ATM 트래픽 혼잡 제어 제안

요약 :

'93년 7월 ITU-TS SG13 Q.8 관련 회의 결과로 작성된 living list 및 권고안 I.371에서는 B-ISDN 트래픽의 혼잡 제어를 위해 현재 제안된 SCD(Selective Cell Discard) 및 EFCI(Explicit Forward Congestion Indication)외에 효율적인 Explicit Backward Congestion Notification(EBCN) 방법이 제안되야 한다고 요구하고 있다. 따라서 본 기고서에서는 OAM셀을 이용해 F4(Virtual Path)레벨 및 F5(Virtual Channel)레벨에서 혼잡 제어를 위한 효율적인 EBCN 방법을 제안한다.

ITU-Telecommunication Standardization Sector

Study Group 13 Delayed Contribution No. D.
Geneva, 7-18 March 1994

Document addressed to : WP 2/13

Question(s) : 7/13, 8/13

SOURCE : KOREA (REPUBLIC OF)

TITLE : Proposal of ATM congestion control using OAM cells

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ABSTRACT
This contribution proposes the EBCN as a congestion control function. For this purpose OAM cells in ATM layer can be used. This contribution should be discussed with the companion contribution "Proposal of OAM Cell Type Identifier for Congestion Control, "D.__________.

1. INTRODUCTION

By the recommendation I.371, SCD(Selective Cell Discard) and EFCI(Explicit Forward Congestion Indication) have been identified as ATM traffic congestion control functions. The EFCI is a congestion notification mechanism which may by used to assist the network in avoidance of and recovery from a congested state. This EFCI mechanism can be used as a reactive technique by the upper layer of ATM to aboid sustained congestion by using some adaptive rate control facilities.

For the efficiency of cell-based reactive technique, congestion should be notified to the source as soon as possible. Efficient cell-based reactive congestion control techniques have been remained in I.371 as further study items. Besides that the use of OAM cells for traffic control and resource management purposes is another further study item by the recommendation I.371.

In this contribution, we propose the EBCN(Explicit Backward Congestion Notification) technique using OAM cells for effcient cell-based reactive congestion control mechanism.

For this purpose, our companion contribution D.__________ proposes new OAM cell type identifiers.

2. DISCUSSIONS FOR EBCN USING OAM CELLS

To avoid the occurrence of severe congestion conditions in the network, congestion should be notified to the source as soon as possible. When congestion occurred in some intermediate node for traffic transfer, the EBCN is faster notification method to the source node than EFCI as shown in Fig. 1.

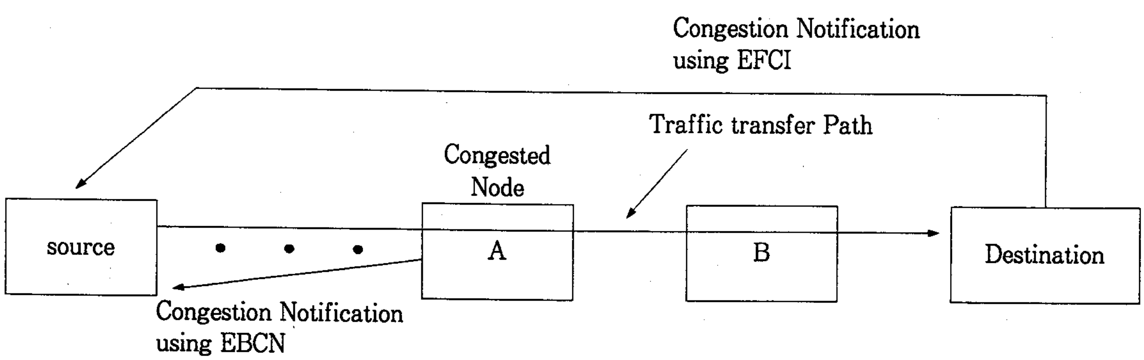

Fig. 1 Congestion Notifications using EFCI and EBCN

In the case of EFCI, a reserved bit in the cell header(PTI=01X) may be used for the indication of congestion of some intermediate node to the destination. But in this scheme, receivers have no information on which nodes in the network are congested and do not indicate the particular connection the marked cell belongs to that is not conforming to the negotiated connection parameters. And due to large propogation delays relative to transmission times of cells, receivers do not react to congestion indication very quickly. By the time a marked cell arrives at a receiver, it is possible that the congested nodes that marked the cell are no longer congested.

EBCN mechanisms minimize the time it takes to notify a source that there is a congested node along its path. For this function a special cell is required. According to this notification sources can react most effectively to congestion along their path.

Despite these adventages, EBCN is not accepted as a congestion indication in ATM because the use of special cells can impose a considerable processing burden on intermediate nodes, and if the same VCI value is not used in both directions, a congested node has to establish a connection to each source before the congestion notification cell can be transmitted.

Based on this considerations, this contribution proposes the use of OAM cells for EBCN in ATM layer. Because the connections for F4 and F5 OAM flows in ATM layer are available and bidirectional, when some intermediate node suffers congestion, OAM cells towards down stream cna be generated immediately without imposing a considerable processing burden on intermediate nodes.

Another adventage of using OAM cells is that 48 byte payload(minus overhead used to identify OAM type and to specify that the cell is carrying a congestion indicator) of the cell can be used to include a variety of information about the congested node.

OAM cell type and function type is proposed by the companion contribution "Proposal of OAM Cell Type Identifier for Congestion Control," D.__________.

3. PROPOSAL FOR THE EBCN USING OAM CELLS

We proposes the insertion of section 3.3.4 in the recommendation I.371 as follows.

3.3.4 Explicit Backward Congestion Notification

The EBCN is a congestion notification mechanism to the source which can be used as a cell-based reactive technique for some adaptive rate control facilities to recover from a congested state. This notification is transfered through OAM cells in ATM layer. The information about the congested node included in OAM cells can be used by source node for several purposes. For example, the end user's CEQ may use this notification to implement protocols that adaptively lower the cell rate of the connection during congestion.

The mechanism by which a network element determines whether it is congested is an implementation issue and is not subject to standardization. The mechanism by which the congestion notification is used by the high layer protocols in the CEQ is for further study.

4. CONCLUSIONS

We proposed to use the EBCN as a traffic congestion control function and to use OAM cells for this purpose.

References

[1] ITU-TS, I.371 "Traffic Control and Congestion Control",
[2] ITU-TS, I.610 "B-ISDN operation and maintenance principles and functions"
[3] ITU-TS, I.371 living list, july 1993

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Question : 9/13

출처 : 한국통신(Rep. of Korea)

제목 : B-ISDN과 기타 공중망 연동 시나리오 및 특성

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요 약 :

본 기고서에서는 동반 기고서 D.__________을 토대로, B-ISDN과 기타 공중망 과의 연동을 위한 시나리오와 각 시나리오의 특성을 기술하고 있다.

B-ISDN의 성공적인 도입을 위해서는 다양한 연동 시나리오를 고려해야 한다. 따라서 본 기고서에서는 B-ISDN과 기타 공중 통신망(예 : PSTN, PSDNs 기타)과의 연동을 위한 두개의 시나리오를 제안하고 있다. 즉 하나는 B-ISDN과 기타 공중망이 64kbit/s based ISDN을 경유하여 연동되는 간접연동(path 1)이고 또 하나는 B-ISDN이 기타 공중망과 직접 연동하게 되는 직접 연동(Path 2)이며 본 고에서는 이의 제안과 더불어 이들의 특성을 분석 제시하였다.

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Question : 9/13

SOURCE : KOREA TELECOM(Rep. of Korea)

TITLE : Interworking Scenarios between B-ISDN and other public networks and its characteristics

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ABSTRACT :

This contribution describes B-ISDN, interworking scenarios with other public networks. (e.g. PSTN, PSDNs etc.), and analyze its characteristics based on the companion contribution D.__________.

For the successful introduction of B-ISDN, we shall consider various interworking scenarios. So, this contribution suggests two path interworking scenarios for B-ISDN interworking with other public networks. One is an indirect interworking between B-ISDN and other public networks through 64kbit/s based ISDN(Path 1) and the other is a direct interworking bewteen B-ISDN and other public networks(Path 2). And here, the characteristics of these kinds of interworking

secenarios are described and identified.

1. Introduction

During the initial stage of B-ISDN, interworking with other networks(e.G. PSTN, PSDN etc.) is very useful for the successful introduction of B-ISDN, because it gives various applications and convenience to users. So we shall consider interworking scenarios between B-ISDN and other networks and, for this, we suggest some interworking scenarios and analyze the characteristics of each scenarios.

2. Interworking scenarios between B-ISDN and other public networks

Interworking scenarios between B-ISDN and other networks are classified into two types as described in Fig. 1. One(Path 1) is an Indirect interworking with other public networks. That means an interworking between B-ISDN and other public networks takes place through 64 kbit/s based ISDN. And the other (Path 2) is a Direct interworking between B-ISDN and other public networks. So we can think interworking issues from these points of view.

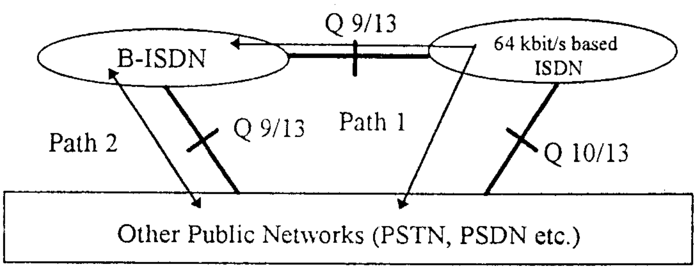

Fig. 1 Interworking scenarios between B-ISDN and other public networks

In addition to this, to analyze the characteristics of Path 1 interworking scenario, it is useful to use inter-and intra-exchange interworking scenario as described in Fig.2. Because it gives an important idea to make an interworking plan(e.g. IWU functionality etc.) and also gives some data for describing degree of complexity to implement interworking.

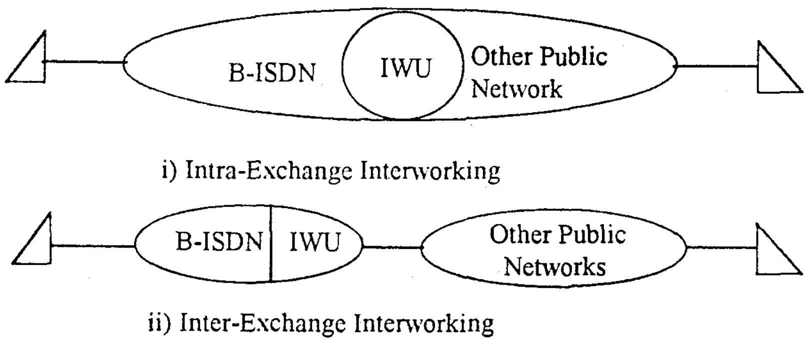

Fig. 2 Inter and Intra exchange interworking seenarios

3. Indirect Interworking Scenario(Path 1)

This interworking scenario is useful when we consider services complied with the evolution step of telecommunication networks. Because, in this scenario, existing public networks(e.g. PSTN, PSDN etc.) interwork with 64kbit/s based ISDN and then 64 kbit/s based ISDN interworks with B-ISDN as depicted in Fig. 3. And in case of this interworking, there is no need to develop new Recommendations, because Rec. I.580 and I.5x0 series of Recommendations with some modifications are enough for this.

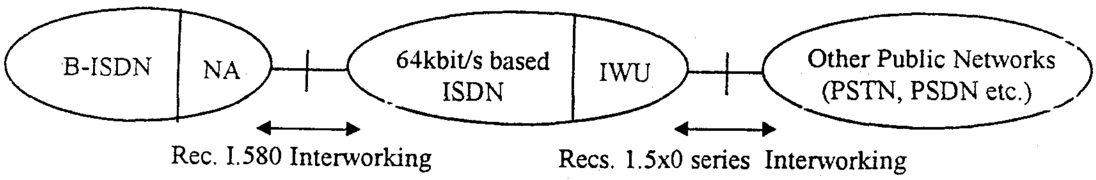

Fig. 3 Path 1 interworking configuration

3.1 Intra-Exchange interworking

In this case, an interworking point is located inside the B-ISDN switching system and the interworking function is carried on this point. For interworking between ATM part and 64kbit/s based ISDN part, the applicable interworking function of Network Adaptor is based on the case 1 of scenario A in ITU-T Rec. I.580, and for the interworking functions between 64kbit/s based ISDN and other public networks are specified in I.5x0 series of ITU-T Recommendations.

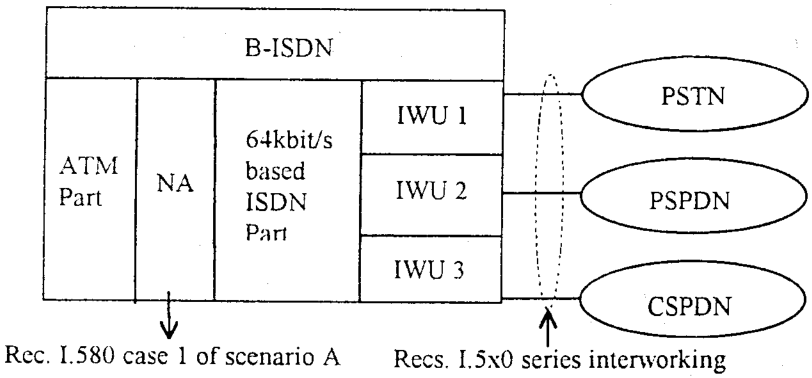

Fig. 4 Intra-Exchange configuration of Path 1 Interworking

3.2 Inter-Exchange interworking

This interworking is accomplished in the separated switching system for B-ISDN and 64kbit/s based ISDN, respectively. So, the interworking point is located in each system. For interworking between B-ISDN and 64kbit/s based ISDN, interworking functions based on the scenario A and B of ITU-T Rec. I.580 are available and the I.5x0 series of ITU-T Recommendations are also applicable for interworking between 64kbit/s based ISDN and other public networks as illustrated in Fig. 5.

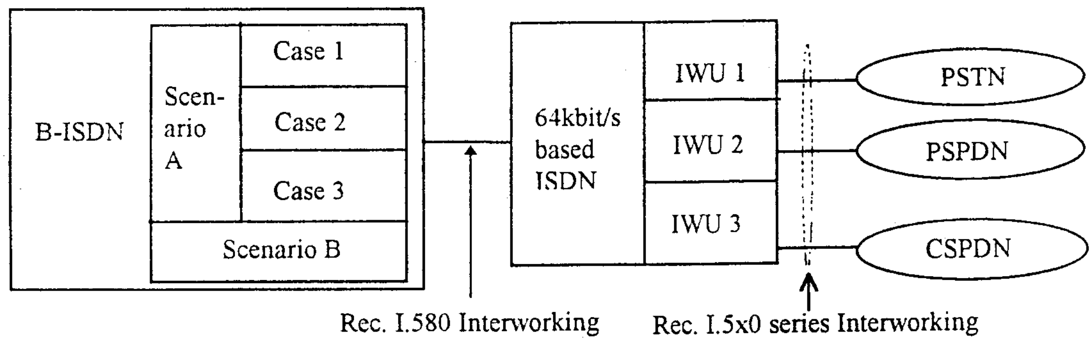

Fig. 5 Inter-Exchange configuration of Path 1 Interworking

4. Direct Interworking Scenario (Path 2)

This is a direct interworking between B-ISDN and other public networks without the intervention of 64 kbit/s based ISDN as explained in Fig. 6.

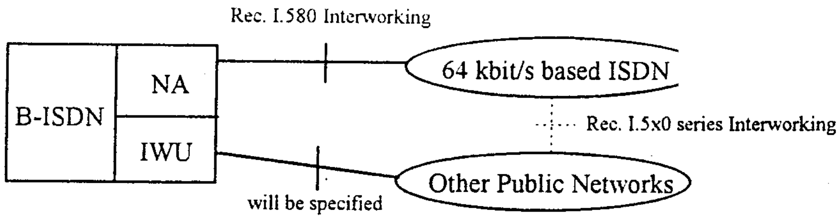

Fig. 6 Direct Interworking Scenario

In this case, B-ISDN has several interworking units for each public networks, which means, an interworking unit is necessary for interworking with each public network. This gives some more complexity for B-ISDN interworking than the Path 1 and there are need to make new Recommendations for each interworking. This is described in Fig. 7.

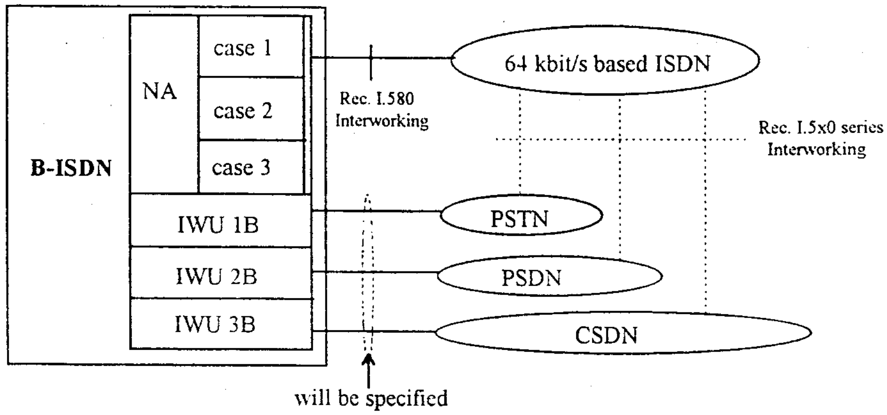

Fig. 7 Configuration of Path 2 Interworking

5. Conclusion and Proposal

When we think about the network evolution steps, Path 1 interworking looks very simple and gives convenience to make interworking plan based on the B-ISDN with other public networks including 64 kbit/s based ISDN. And this also gives a simple way to make general arrangements of B-ISDN interworking from international standard points of view and there is no need to make other Recommendations for this. But Path 2 interworking is more complex than Path 1 and needs some new Recommendations.

As suggested in the companion contribution D__________, it is proposed to insert there scenarios into the Recommendation I.510 or new Recommendation for arrangements of B-ISDN interworking.

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Question : 9/13

출처 : 한국통신(Rep. of Korea)

제목 : B-ISDN 연동 관련 권고 제정을 위한 방안

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요 약 :

본 기고서에서는 B-ISDN과 Satellite network, Private network 및 기타 공중망과의 연동을 위해 필요한 권고의 제정 방안을 제안하고 있다. 본 기고서에서 제안하는 내용들의 배경이 되면서 이에따른 B-ISDN과 기타 공중망과의 연동에 관련된 시나리오 및 각 시나리오의 특성 분석 결과는 동반 기고서 D._________ 에서 제시하고 있다.

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Question : 9/13

SOURCE : KOREA TELECOM(Rep. of Korea)

TITLE : A way for developing Recommendations for B-ISDN interworking

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ABSTRACT :

This contribution suggests a way to develop recommendations regarding B-ISDN interworking with other networks(eg. Satellite network, Private networks and other public networks). According to this suggestion, some scenarios and its characteristics for B-ISDN interworking with other public networks are identified and analyzed in the companion contribution D.__________.

1. Rationale

Question 9/13 is related to the interworking of B-ISDN with other networks. Under this question, B-ISDN interworking with 64 kbit/s based ISDN, other public networks(eg. PSTN, PSDNs etc.) and private networks including LANs are studied. And, if necessary, we make some new and revised recommendations.

For these objectives, we think about the present status in these areas for efficience, because somethings are common or already prepared from other question, but need some guidelines or reorganization and somethings are purely new one. In addition to this, we also have to consider the evolution steps of public networks and timing availability of services to the user.

For example, in Q.9/13, we study the interworking principles which need to be defined for B-ISDN interworking with several networks and what recommendations are needed to enable B-ISDN interworking. For this, recommendation status for B-ISDN interworking with other networks is summarized as in Fig. 1.

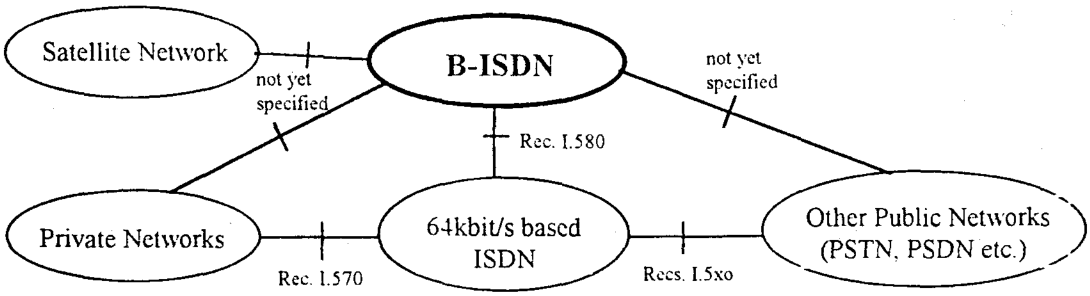

Fig. 1 Recommendation status for B-ISDN interworking

From Fig. 1, we can find that some paths for B-ISDN interworking with other networks already exist and other paths are not yet prepared. Then, when we think about the network evolution steps and a timing availability, we can summarize a way for studying Q 9/13. That is, B-ISDN interworking with private networks and satellite network are specified in the near future, because these networks require higher speed and broader band of network capabilities than 64kbit/s based ISDN for their applications. But in case of interworking with other public networks in a beginning stage of B-ISDN, it looks enough to interwork B-ISDN through 64 kbit/s based ISDN to the B-ISDN, as requirements from other public networks are satisfied in the 64kbit/s based ISDN. Then, all of these are summarized as in Fig. 2.

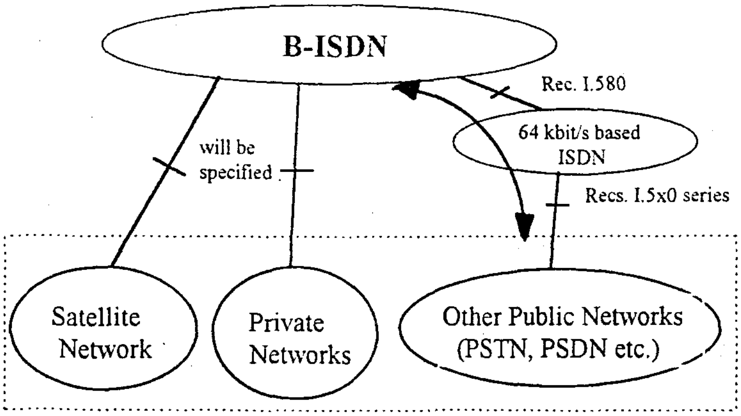

Fig. 2 Recommended B-ISDN inteworking configuration

2. Proposal

Form above perspectives, it is proposed to study B-ISDN interworking issues as following view points:

- interworking with satellite network,
- interworking with private networks including LANs,
- interworking with 64knit/s based ISDN(based on the Rec. I.580)
- interworking with other public networks(eg. PSTN, PSDNs ect) through 64kbit/s based ISDN, and
- interworking with other public networks directly(in future).

And it is also proposed to insert some guidelines of B-ISDN interworking into Rec. I.510 titled "Definitions and general pricipples for ISDN interworking", or to make new recommendation concerning the arrangements of B-ISDN interworking with other newtorks including statellite network, private networks and other public networks.

3. Conclusion

This contribution suggested a way to study B-ISDN interworking with other networks and proposed some guidelines.

According to these guidelines, some B-ISDN interworking scenarios are suggested and its characteristics are analyzed in a companion contribution D ________.

ITU-Telecommunication Standardization Sector

Study Group 13
Geneva, March 1994

Delayed Contribution D.
Text available only in English

Question : 13/1

Source : Korea Telecom

Title : A Proposal of SDH-based ATM transport network layered model

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1. Introdution

Architectures of transport networks based on the SDH are descibed in ITU-T G.803(fomerly G. snal and SDH-based ATM transport network is shown in Figure A-2/I.311, but the relationship and/or alignment of the Recommendation I.311 with the Recommendation G.803 is not described. This contribution proposes a layered model of SDH-based ATM trasport network which is based on the layering concept of G.803.

2. Discussion about Recommendation I.311 and Recommendation G.803

There are two different terms used in these recommendations although their concepts are almost the same. One is "level" in Recommendation I.311 and the other is "layer" in Recommendation G. 803. The unification of the two terms is needed to avoid possible confusion and clarify the relationship and/or alignment of the Recommendation I.311 with the Recommendation G.803.

3. Tex proposal

We propose to include the following underlined text and Figure A-3/I.311 in I.311 Annex A.

This annex contains two examples of the hierarchical structure for the ATM transport network and the relationship and/or alignment of the Recommendation I.311 with the Recommendation G. 803.

Figure A1/I.311 shows the hierarchical structure of the cell based ATM transport network and Figure A2 shows the hierarchical structure of the SDH based ATM transport network.

Figure A3/I.311 shows the relationship and/or alignment of the Recommendation I.311 with the Recommendation G.803. The "level" in the Recommendation I.311 is mapped into "layer network" in the Recommendation G.803 and ATM layer is provided over the higher order path layer in Figure 3.10/G.803

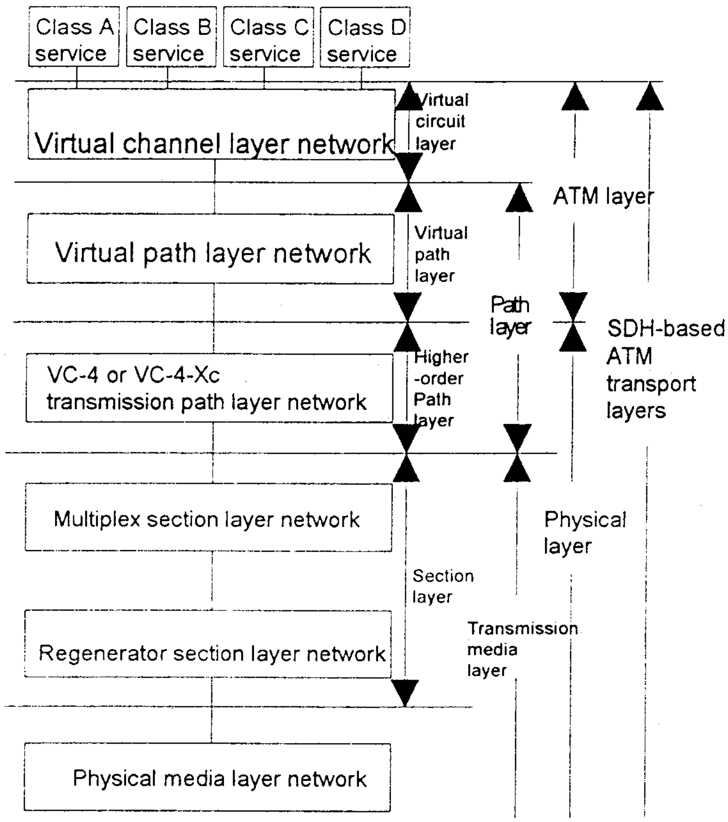

Figure A-3/I.311
SDH-based ATM transport network layered model

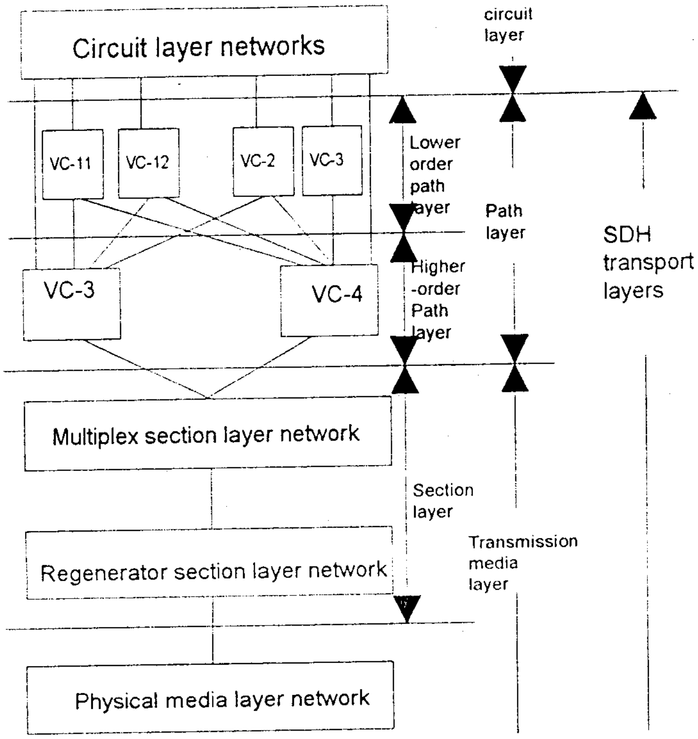

Figure 3.10/G.803
SDH-based transport network layered model

ITU-Telecommunication Standardization Sector

Study Group 13
Geneva, March 1994

Delayed Contribution D.
Text available only in English

Question : 13/3

Source : Korea Telecom

Title : Proposed Editorial Amendaments to Draft revised Recommendation I.432

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1. Introdution

This contribution proposes some editorial amendaments to clarify the SOH(Section Over Head octet) and AU pointer of STM-1 and STM-4 frame. First amendment is related to byte Z2 of SOH. Second amendment is related to AU pointer.

2. Discussion

2.1 Z2 of SOH

At last SG XVIII/7 meeting(Geneva, January 1993), the previous agreement of using the Z2 bytes as a Section FEBE at STM-1 and STM-4 level was confirmed. It was also agreed to rename byte Z2 used as a Section FEBE, M1. To keep consistency of SOH notation, It is desirable to rename Z2, M1 in Fig 8/I.432 and Fig 10/I.432.

2.2 AU pointer

In Fig 8/I.432, AU pointer was shown as three H1 and three H2 bytes. But following Section 3 in Recommendation G.709, the first H1 octet and the first H2 octet should be used as pointer in case of using C4. The 2nd H1 octet and the 3rd H1 octet has a pre-defined pattern, 1001SS11 as shown in Fig. 8/I.432. The 2nd H2 and the 3rd H2 octet has a predefined pattern, 11111111.

In SDH based ATM transmission, VC-4 or VC-4-4c are used. For notation consistency between Recommendation G.709 and Recommendation I.432, it is desirable to revise Fig. 8/I.432 to the proposed Fig. 8/I.432 and Fig. 10/I.432 to the proposed Fig. 10/I.432.

2.3 Byte and octet

In Recommendation I.432, two terms, byte and octet, are used. It is desireable to use octet instead of byte in Fig. 10/I.432.

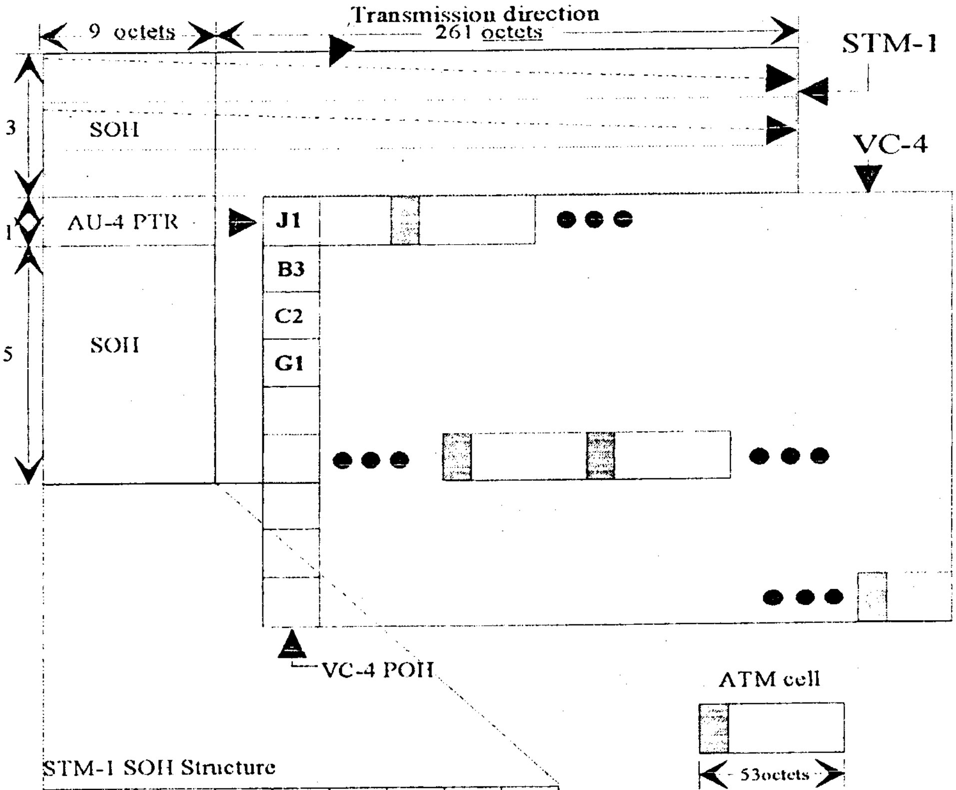
3. Text proposal

Figure 8/I.432 of section 4.2.2.2, the third Z2 is replaced by M1 and the 2nd H1, the 3rd H1, the 2nd H3 and the 3rd H3 are replaced by Y, Y, all 1s, all 1s.

Figure 10/I.432 of 4.2.2.3, the third Z2 is replaced by M1, 9×4 byte is replaced by 9×4 octets, 261×4byte is replaced by 261×4 octets.

The Z2 of the fifth line in the second paragraph of 4.2.2.4.3 is replaced by M1.

In 4.2.2.4.1 Table 3/I.432, Z2 is replaced by M1



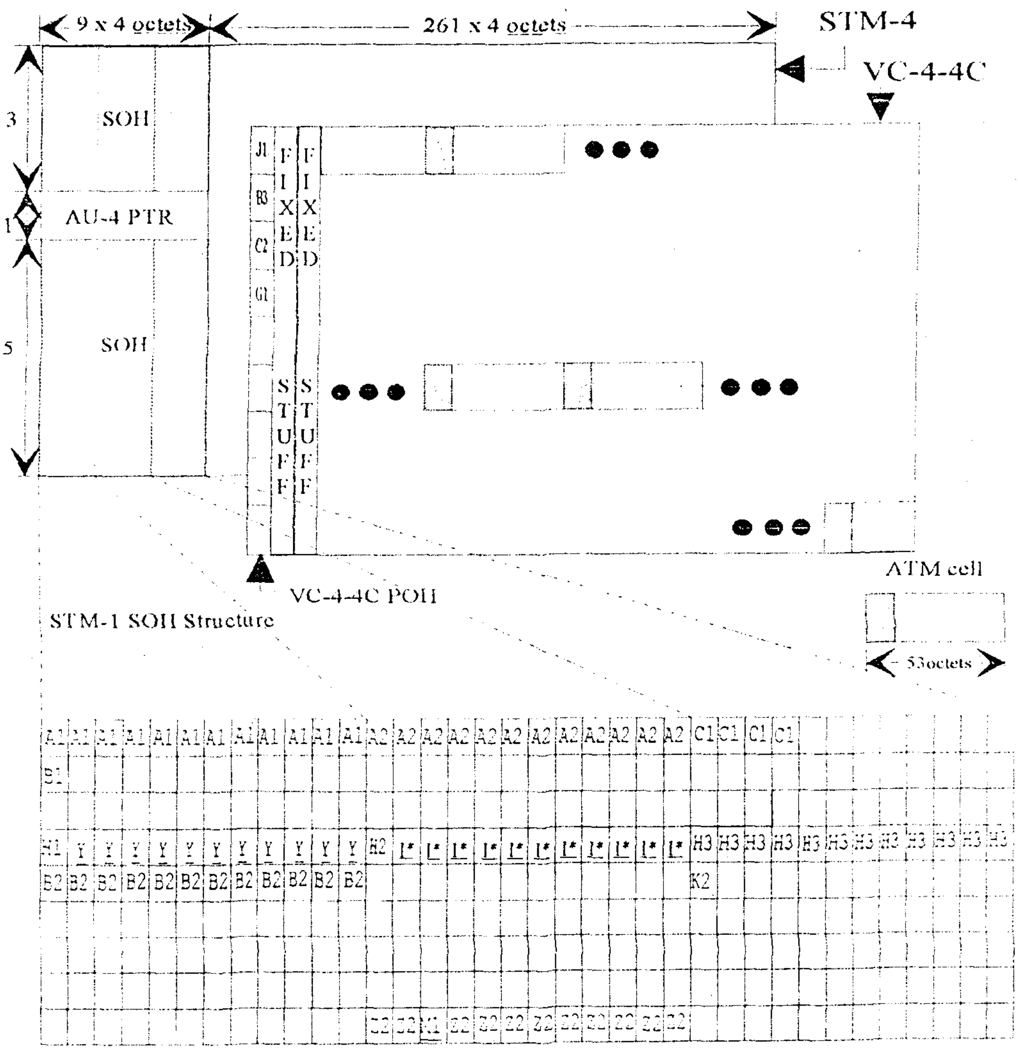
STM-1 SOH Structure

A1	A1	A1	A2	A2	A2	C1		
B1								
H1	Y	Y	H2	1*	1*	H3	H3	H3
B2	B2	B2				K2		
			Z2	Z2	M1			

1* : all 1s octet
Y : 1001SS11 (s bits are unspecified)

FIGURE 8/I.432

155 520 kbit/s frame structure for SDH based UNI



1* : all 1s octet
Y : 1001SS11 (s bit is not specified)

FIGURE 10/I.432

622 080 kbit/s frame structure for SDH based UNI

ITU-Telecommunication Standardization Sector

Study Group 13
Geneva, March 1994

Delayed Contribution No. D.
Text available only in English

Question : 16/13

SOURCE : KOREA TELECOM(REPUBLIC OF KOREA)

Title : Clarification of QoS/NP Mapping

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1. Introcdution

In section 3.1.1 of Recommendation I.350, the term "mapping"is mentioned as follows:
The definition of QoS and NP parameters should make mapping of values clear in case where there is not a simple one-to-one relationship between them.
In section 3.2 of Recommendation I.350, "mapping"is described.
In describing the QoS of teleservices, the performance of the terminal equipment(TE) has to be taken into account. For a teleservice, there should be a mapping between the QoS of the teleservice and the performance of the customer eqipment including the terminal and the overall (end-to-end) NP of the connection elements supporting this service.
For bearer service there should mapping between the QoS of the bearer service and the overall (end-to-end) NP of the connection elements supporting this service.
In Recommendation I.210, "teleservice" and "bearer service" are defined and Figure 1/I.210 shows the access points at which customers can access various telecommunication services.

2. Rationale

First of all, little is known about the ATM performance requirements of future B-ISDN services, especially multi-media applications. Even the requirements of foreseeable B-ISDN services (i.e., N-ISDN services) have not been thoroughly analyzed in terms of ATM network performance parameters; only some(not exact) definitions are known. This is because the ATM performance requirements of future B-ISDN services, especially multi-media applications, depend not only on the diverse QoS requirements from user, but also on the layer processing and workload in terminal equipments.

So, in order to guarantee QoS to the user, it is necessary to introduce a set of QoS parameters whose properties indicate the nature and the requirements in layered protocol stack. These QoS parameters are difined for each layer such that each layer can guarantee the demanded QoS to its next-higher layer and demends a possibly diferent QoS from its next-lower layer. So, it is important to translate user requirements into AAL QoS parameters. We call this mechanism layer QoS mapping. See a companion contribution [3] as the selection and definition of QoS parameters.

The AAL QoS parameters are basically the end-to-end parameters including performance of the customer eqipment and the overall (end-to-end) NP of the connection elements supporting this service. User-network access at UNI affects the QoS in a non-negligible manner. First, the configuration of customer network installation (ex. bus, ring, etc.) affects the QoS. Cell error, cell loss, and cell delay are degraded little by the customer network. In contrast, jitter can be particularly affected by the complex distributed structure of customer network. Second, the user-network access procedure (physical, ATM layer and AAL) at S and T interface can degrade the QoS. Therefore, AAL QoS at customer eqipment can be very different from NP. Therefore, there should be a mapping between the AAL QoS and the overall(end-to-end) NP of the connection elements supporting this service. We call this mechanism QoS/NP mapping.

The NP parameters are viewed in the ATM network and are the performance requirement between T interfaces, and therefore can be mapped by the performance requirement on the intermediate node, which is the NEP(Network Element Performance) parameter. So, there should be a mapping between NP and their corresponding NEP. We call this mechanism NP/NEP mapping.

There are several reasons why error and throughput performance require mapping. First of all, the throughput requested by the service user does not take into account any control information overhead required by the layered protocol stack. Second, retransmission for error recovery in data transport lowers throughput efficiency and enhances error performance. Third, error and throughput requirement can be significantly changed by means of coding techniques in the case of voice and video.

Delay and delay variation (or jitter) require mapping. The delay requirement is affected by the layer's segmentation/reassembly process. The jitter requirement is not affected by the layer's segmentation/reassembly, byt by playout scheme and UNI access.

3. Results of Mapping

The ATM NP parameters resulting from the mapping can be very different to the QoS parameters, furthermore, even for a single service, the NP parameters are highly dependent on the layer's protocol processing and the layer functions chosen(ex. AAL types). These QoS/NP differences (ex. throughput value, semantics in error requirement, and delay and jitter values) should be considered in a traffic contract between user and ATM network provider. On the other hand, the B-ISDN has to be flexible to meet a variety of QoS requirements (ex. multiple QoS classes).

4. Remark

The Layer QoS mapping in section 2 is a mapping between the QoS of the teleservice and the QoS of the bearer service. The QoS/NP mapping is a mapping between the QoS of the bearer service and NP. The NP/NEP mapping is a mapping between NP and NEP.

It is also believed that the above mappings should be also considered in the signalling and the OAM-PM(Performance Monitoring) of B-ISDN. .

5. Proposal

In keeping with the above idea, it is proposed:

1. to inclued QoS/NP mapping concept in I.350.
2. to replace Figure 1/I.356 by the Figure 1 of this contribution so that there should be a consistency of term "QoS of the teleservice", "QoS of the bearer service", and "NP" in I.350 and I.356.
3. to revise I.210, in the context of B-ISDN, in order to be consistent with the above idea, As in Figure 1/I.210 the Bearer Service cannot be accessed at S or T interface, but through AAL Service Access Point(SAP).

References

[1] Recommendation I.350, General Aspects of Quality of Service and Network Performance in Digital Networks, including ISDNs, July 1992.

[2] Recommendation I.356, B-ISDN ATM Layer Cell Transfer Performance, January 1993

[3] Contribution D._______, QoS Parameters in AAL, January 1994

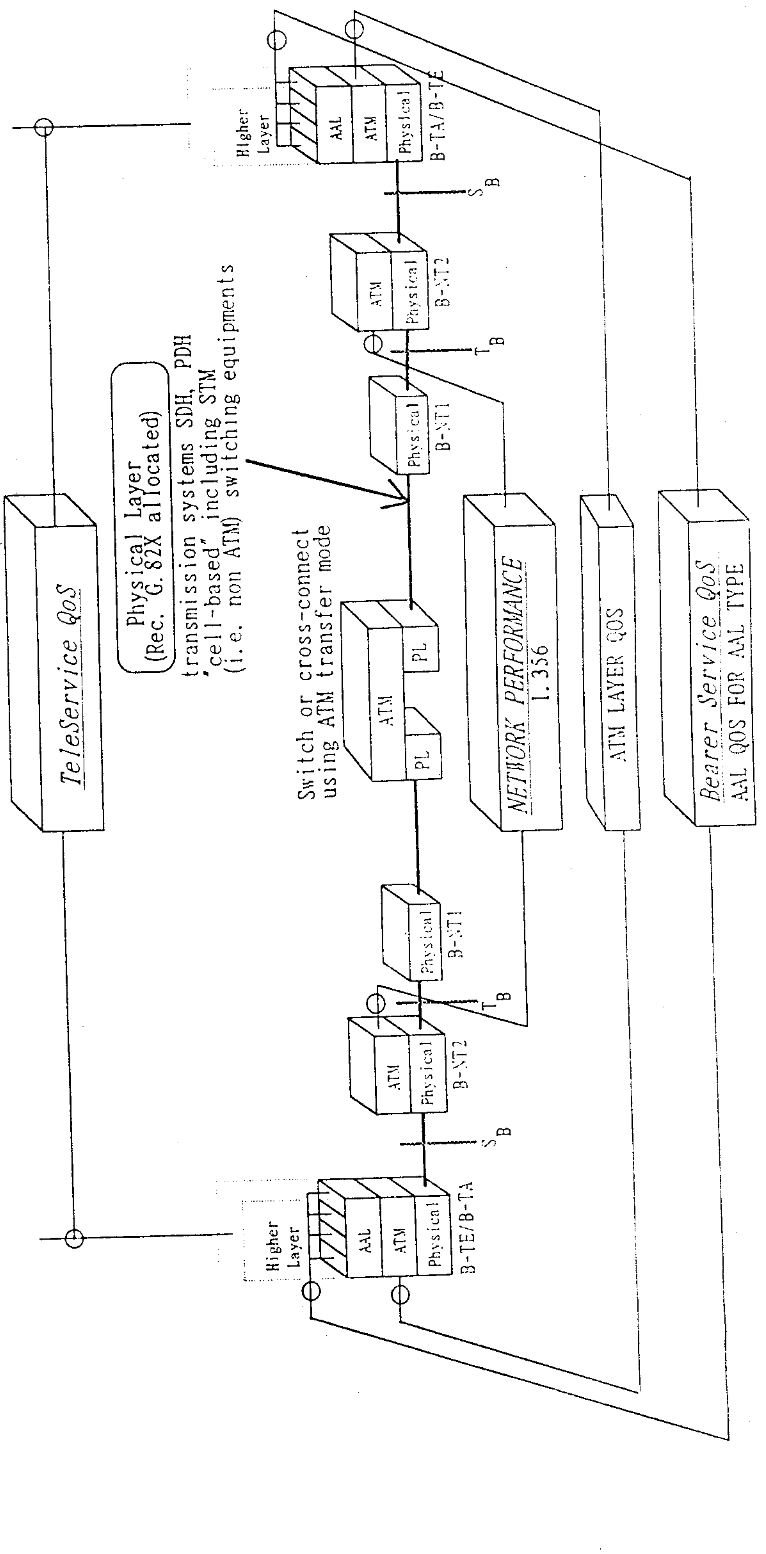

Figure 1/I.356 Layered model of performance for B-ISDN

ITU-Telecommunication Standardization Sector

Study Group 13
Geneva, March 1994

Delayed Contribution No. D.
Text available only in English

Question : 16/13

SOURCE : KOREA TELECOM (REPUBLIC OF KOREA)

Title : QoS Parameters in AAL

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1. Selection of QoS parameters in layer

The selection of QoS in each layer depends on the requirements of its higher layer. Because each layer receives the SDUs(Service Data Units) from a higher layer and uses the corresponding PDUs (Protocol Data Units) to communicate with peer layers, the QoS parameters have to be based on the SDU. That is, the AAL QoS parameters are the needs of the higher layer and are based on the AAL SDU. These QoS parameters are accessed through the SAP(Service Access Point) between layers.

2. QoS parameters

1. QoS parameters in the AAL

The AAL QoS parameters are attributes of the needs of the higher layer and must therefore be independent of the ATM network. The AAL QoS requirements are represented as the AAL QoS parameters. Note that the role of AAL is to provide, for each type of service, the appropriate solutions to reach the required QoS, hence to absorb the gap between AAL QoS and ATM layer QoS.

—Frame Error Ratio(FER)

A frame is the SDU received from a higher layer. As an error requirement, FER means the percentage of the frames in a given connection that may be errored on the average. Let total-Frame denote the total number of frames received from the higher layer and errored-frames the number of errored frames, i.e. containing errors that are not corrected by the AAL.

FER = errored-frames/total-frames.

Why use the FER instead of the number of bit errors per volume (ex. BER)?

The reason is that the FER can represent the BER requirements. Moreover, because each layer handles its SDUs, the QoS parameters have to be based on this data unit. Note that the ATM layer QoS parameters are based on the ATM layer SDU(cell payload).

The AAL-SDU can be a bit(for circuit emulation), byte(for voice, video), or a structured data. For data services, the AAL-SDU can be a message or a stream of which the length is either fixed or variable. There are two cases to take into account because of segmentation or blocking of AAL-SDU. In case of segmentation, a single AAL-SDU is transferred in one or more PDUs. By contrast, in case of blocking one or more AAL-SDUs is transferred in one PDU.

The use of the FER might be contested in the case of real-time video or audio services, where an errored frame can lead to a loss of synchronization and thus possibly a severe degradation of video quality, or a merely trivial one. The FER would thus seem insufficient to describe fully the user QoS requirements. This is, however, not the case when using layered video coding techniques. Each video signal component can then be transmitted separately with its own QoS requirements, which enables fundamental components, such as those containing synchronization information, to be transmitted with a rigorous QoS without having to demand an equally stringent QoS for the less important components such as a high resolution component.

– Throughput

The average throughput of a connection is a measure of the bit rate attainable by the connection. The throughput requirement is the average throughput actually provided by the AAL, that is the minimum average throughput the AAL must offer to a higher layer throughout the duration of the call.

– Frame Delay : D

$$D_i \le D,$$

D_i is the delay with which the i-th frame sent by the higher layer is delivered to the destination.

– Frame Delay Variation (or Frame Jitter) : J

$$J_i = | D_i - D | \leq J,$$

D is the ideal or target delay that is calculated by the AAL, Ji is The Jitter of i-th frame sent by the higher when delivered to the destination.

2. QoS parameters in the ATM layer

St the ATM layer we discern the following QoS parameters. These QoS parameters correspond to the ATM NP parameters.

–Cell Error Ration(CER)

–Cell Loss Ration(CLR)

–Cell Misinsertion Rate(CMR)

–Throughput : W'

The throughput requirements at the ATM layer are given in terms of average thorughput. Note that throughput parameter must be in principle differentiated from ATM traffic characteristics, but describes the requested capacity of cell flow within a connection time. In the ATM layer, the cell flow capacity may correspond to the average cell rate in traffic parameter when there is no use of the fast resource management or protocol.

–Cell Dalay and Cell Jitter : D' and J'

The delay and jitter in the ATM layer have the same definition as in the AAL (see above) with the understanding that these are now concerned with ATM cells, not frames.

3. ATM Network Performance(NP) parameters

The NP parameters are visible only to the network. The NP parameters [2] which are currently defined are as follows:

–Cell Error Ratio(CER)

–Cell Loss Ratio(CLR)

–Cell Misinsertion Rate(CMR)

–Cell Delay

–Cell Delay Variation(CDV) or Jitter

–Severely Errored Cell Block Ration(SECBR).

3. Remark

In this contribution, the QoS parameters defined in Section 2 are not exhaustive in the sense that they are related only to the data transfer phase in a connection. The QoS parameters related to the connection and disconnection have to be defined in the AAL. Moreover, QoS parameter related to the busrt level access control(ex. Burst Blocking Probability) should be eventually defined for services using the fast resource management principle.

4. Proposal

It is proposed:

1. to Define the above AAL QoS parameters as the generic Bearer Service QoS parameters in I. 356. The reason for defining the QoS parameters is described in a companion contribution [4].
2. to include the following text in I.356:

"Some additional (service specific) AAL QoS parameters could be defined in each type of AAL."

References

[1] Recommendation I.350, General Aspects of Quality of Service and Network Performance in Digital Networks, including ISDNs, July 1992
[2] Recommendation I.356, B-ISDN ATM Layer Cell Transfer Performance, January 1993
[3] Recommendation I.363, B-ISDN ATM Adaptation Layer (AAL) Specification, July 1992
[4] Contribution D._______, Clarification of QoS/NP Mapping, January 1994

ITU-Telecommunication Standardization Sector

Study Group SG13 지연기고서

Geneva, March 1994

Question : 3/13

Source : Korea Telecom(Rep. of Korea)

제목 : 권고안 I.374의 개념과 지능망(IN) 개념의 관계 정립

요약 :

CCITT 잠정권고 I.374는 광대역 및 64Kbit/s ISDN에서는 멀티미디어 서비스 제공을 위한 망성능을 규정하기 위해 "멀티미디어 서비스 제공을 위한 통신망 성능"을 표준화하고 있다.

본 기고서에서는 권고안 I.374에서의 개념과 현재 개발되고 있는 지능망(IN)개념과의 관계를 정립한다.

ITU-Telecommunication Standardization Sector

Study Group SG13 Delayed Contribution No. D.

Geneva, March 1994 Text available only in English

Question : 3/13

Source : Korea Telecom(Rep. of Korea)

Title : Relationship between the concepts in I.374 and those of the evolving intelligent Network(IN)

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ABSTRACT

Draft Recommendation I.374 specifies "Network capabilities to support multimedia services" to specify network capabilities for multimedia services on both broadband and 64Kbit/s-based ISDN [1].

This contribution identifies the relationship between the concepts in I.374 and those of the evolving Intelligent Network(IN).

1. Introduction

I.374 defines i) the functional architecture of multimedia services, and ii) the network capabilities expected to be possible in 64Kbit/s-based and broadband ISDN networks offering multimedia service support [1].

In the last meeting, the relationship between the concepts in I.374(Network capabilities to support multimedia services) and those of the evolving intelligent Network(IN) has been defined as one of the urgent issues to be identified [2].

This contribution identifies the relationship between the concepts in I.374 and those of the evolving Intelligent Network(IN).

2. Architecture and functions of IN for multimedia communications

The Intelligent Network(IN) concept is broadly based on the deployment of databases and various computer based support systems within a communication network to implement a variety of advanced network services [3]. Intelligent Network(IN) has been developed with following technical features[3].

- Network connection control intelligence at centralized nodes which are known as Service Control Point(SCP),
- Natwork nodes, which are known as Service Swithcing Points (SSPs), switch connections under the direction of the SCP,
- Standard network interfaces(for example, CCS 7 and ISDN) at points such as SCP and SSP,
- Rapid and economic service creation capabilities(such as customer programmability and program portability) by which the network operators can identify a need, create or acquire a corresponding service, and deploy it while maintaining the integrity of the network.

As a consequence, the IN architecture will increase the intelligence of transport networks in multimedia call routing and connection managements. Especially, it is tightly related to the connection management of the network capabilityes, that is defined in I.374.

One of the intelligent features of in for multimedia communications will be the provision of Customer Service Profiles within the network [4]. The profile contain the user's default communication profile, including terminal capabilities, call default parameters and call routing logic for various default conditions(e.g. routing to a message service on no answer). Using the approach, the transport network can establish a call and subsequent connections to match the calling and called party terminal attributes, without continuously having to negotiate with each party. Naturally, if the user does not wish to user the default setting, it will be necessary to provide a simple and easy means of either negotiating between the users for an appropriate set of call and media parameters, and/or to edit the network based Customer Service Profile appropriately.

Another feature of IN for multimedia communication in the intelligent mapping of user-friendly virtual address to physical address. This intelligent mapping and routing function will enable various advanced network services, such as Multimedia Private Virtual Network(MPVN) and Multimedia Green Number Service(MGNS) or 800 service.

Also the IN architecture will be the fundamental platform for various multimedia Universal Personal Telecommunication(UPT) functionality, including customized service profiles, location registration, mobility control and authentication features.

Figure 1 shows the architecture of transport and intelligence function for multimedia communication.

3. Conclusion

This contribution identified the relationship between the concepts in I.374 and those of the evolving intelligent Network(IN). It showed the architecture of transport and intelligence functions for multimedia communications.

References

[1] ITU-T Draft Rec. I.374, Framework recommendation on "Network Capabilities to Support Multimedia Services", COM XVIII R 117E, July 1992

[2] ITU-T TD 65(P), Report of Working Party 13/1, July 1993

[3] W. D. Ambrosch, A. Maher, and B. Sasscer, The Intelligent Network, Springer-Verlag, 1989.

[4] M. Milner, A. Hamiltion, P.Barry and R. Stephen, "Multimedia Services:User and Delivery Requirements", Asia-Pacific Symposium on "Multimedia Services and Networking for the 1990's", World Congress Center, Melbourne, Australia, pp. 11-17

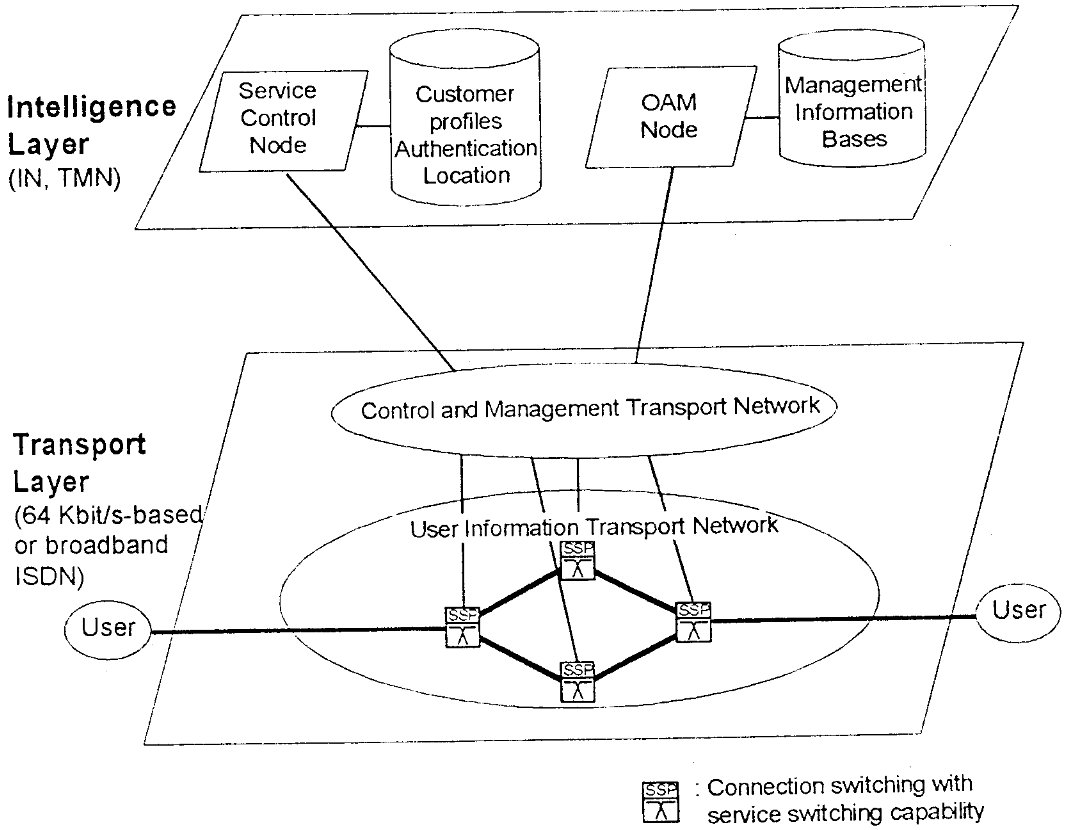

Figure 1. Transport and Intelligence functions for multimedia communications

ITU-Telecommunication Standardization Sector

Study Group 13 Delayed Contribution No. D.
Geneva, 7-18 March 1994
Question(s) : 8/13

SOURCE : KOREA(REPUBLIC OF)

TITLE : ATM망에서의 최대 셀전송률 granularity 및 코딩 scheme 제안

요 약 :

ATM망에서의 트래픽 제어를 위한 UPC/NPC기능을 구현하기 위해 요구되는 peak cell rate granularity값들을 제안하고 신호 정보에서 그 값들을 표현하기 위한 coding scheme를 정의하여 이를 권고안 I.371에 반영할 것을 제안한다.

ITU-Telecommunication Standardization Sector

Study Group 13 Delayed Contribution No. D.
Geneva, 7-18 March 1994

Question : 8/13

SOURCE : KOREA(REPUBLIC OF)

TITLE : Proposal of the specificaton of the Peak Cell Rate granularity and coding

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ABSTRACT

This contribution proposes the ATM peak cell rate(PCR) granularity, its coding scheme and a translation rule from the parameter declared and coded in signalling messages to PCR or peak bit rate(PBR).

1. INTRODUCTION

In the rocommendation I.371, the ATM PCR granularity and its coding are for further study. The cell rate information which is conveyed by signalling messages will be mapped into corresponding parameters and parameter values used by ATM layer traffic functions. The current SG11 proposal is to define the information contained in signalling messages in terms of a coding scheme for the PCR as an integer variable of 3 octets. Our contribution proposes the PCR granularity considering UPC/NPC functions and its coding scheme using integer variables of 3 octets. And we proses a translation rule from the parameter declared and coded in signalling messages to PCR or peak bit rate(PBR).

2. Discussion of PCR granularity and its coding

For an arbitrary traffic source with Virtual Channel Identifier/Virtual Path Identifier(VCI/VPI) =m, we define serveral notations as follows.

L : one cell length(=53×8bits=424bits)

v : channel speed(bits/sec, bps)

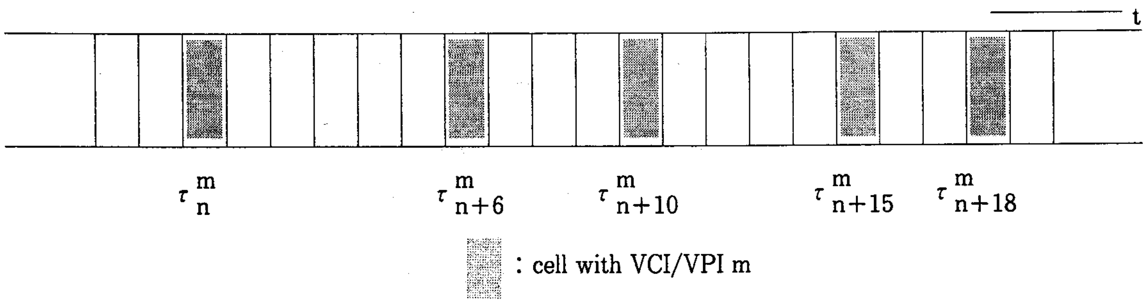
C : channel capacity (=v/L cells/sec, cps)

τ_i^m : measurement time of the UPC/NPC for VCI/VPI m at i-th slot in the output link

PBR(τ_i^m) : PBR measured by UPC/NPC for VCI/VPI m at time τ_i^m

PCR(τ_i^m) : PCR measured by UPC/NPC for VCI/VPI m at time τ_i^m

When the ATM link is sloted as shown Fig.1, the PCR measured by UPC/NPC may be change only at the begining of the slot which are represented as arrows. The first cell with VCI m is arrived at τ_n^m and other cells are arrived at τ_{n+6}^m, τ_{n+10}^m, τ_{n+15}^m, τ_{n+18}^m.



Figuure 1. Time measured by UPC/NPC for VCI/VPI m.

In this case, the UPC/NPC can estimate the PBR and PCR as follows.

$$PBR(\tau_i) = \begin{cases} 0 & i \leqq n+5 \\ v/6 & n+6 \leqq i \leqq n+17 \\ v/3 & n+18 \leqq i \end{cases} \quad (1)$$

$$PCR(\tau_i) = \begin{cases} 0 & i \leqq n+5 \\ C/6 & n+6 \leqq i \leqq n+17 \\ C/3 & n+18 \leqq i \end{cases} \quad (2)$$

These equations mean that the UPC/NPC can estimates only v/k bps or C/k cps where k=1, 2, ··· Futhermore, this rule is applied to the terminal equipment which inserts its generating cells to the output link. Naturally, the PCR granularity is determined by k. Accordingly, the maximum value of k must be c onsidered.

Since SG 11 proposed 3 octet for the PCR granularity and SG 13 agreed it provisonally, we propose a format for the PCR granularity as Figure 2. The access channel capacity(ACC) as a binary value represents the capacity of the channel accessed by cells and k as a binary value represents the channel capacity divider(CCD). We can represent the PBR and PCR of 155.52×2^{ACC} Mbps from the format in Figure2 as follows.

$$PBR = 2^{ACC} \times 155.52 Mbps/CCD \quad (3)$$

$$PCR = 2^{ACC} \times 155.52 Mbps/(L \times CCD) \quad (4)$$

The most significant 4 bits in the first octect are reserved for special services(e.g. telemery service).

8	7	6	5	4	3	2	1	Bit Octet
Reserved				ACC				1
CCD								2
CCD								3

ACC : Access Channel Capacity
CCD : Channel Capacity Divider

Figure 2. Coding format for PCR

3. Proposition of PCR granularity, its coding and mapping table

This contribution proposes equation (3) and (4) as the PBR and PCR granularity for CH=2^{ACC} x155.52Mbps channel (wher ACC=0…15 and k=1…$2^{15}-1$)and proposes the coding format as described in Figure 2.

If the CCD is not sufficient(i.e., if we want smaller PCR), we propose using 4 octets for coding PCR granularity(3 octets for CCD and 1 octet for ACC and reserved bits.)

We can easily translate from the parameter declared and coded in signalling messages to PCR or PBR using equation (3) and (4). Table 1 shows CCD coding and corresponding PBR and PCR for 155.52Mbps(ACC=0) channel. For example, a voice source using ADPCM requires k=4401 because one byte of voice is sampled per 250 u sec and the construction of ATM payload (48 octets) requires 12 m sec. It corresponds to PCR=83.3333…cell/sec. Thus it follows that k=4401 and CCD=00000001 00110001.

Table 1. CCD coding and PBR, PCR Granularity for 155.52 Mbps(ACC=0) channel

k	CCD Coding		PBR Granularity	PCR Granularity	Remarks
0	00000000	00000000	○ ○	○ ○	Forbidden
1	00000000	00000001	155.520 Mbps	366.792 Kcps	
2	00000000	00000002	77.760 Mbps	91.678 Kcps	
			⋮		
4401	00010001	00110001	35.337 Kbps	83.343 cps	Voice(ADPCM)
			⋮		
65534	11111111	11111110	2.373 Kbps	5.597 cps	
65535	11111111	11111111	Below	Below	Any value

4. Conclusion

This contribution proposes the ATM PBR and PCR granularity and its coding scheme using 3 octets and a translation rule. The granularity is proposed cosidering the UPC/NPC functions. If PBRs smaller than 2.373 Kbps is required, we propose to use 4 octets coding scheme.

References

[1] ITU-TS I.371 “Traffic Control and Congestion Control”,

[2] ITU-TS I.371 Living List, July 1993, Geneva