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OF ITU

Q.2111

Amendment 3
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SERIES Q: SWITCHING AND SIGNALLING

Broadband ISDN – Signalling ATM adaptation layer
(SAAL)

B-ISDN ATM adaptation layer – Service specific
connection oriented protocol in a multilink and
connectionless environment (SSCOPMCE)

**Amendment 3: API for SSCOPMCE over
Ethernet and UDP port number**

ITU-T Recommendation Q.2111 (1999) – Amendment 3

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ITU-T Recommendation Q.2111

B-ISDN ATM adaptation layer – Service specific connection oriented protocol in a multilink and connectionless environment (SSCOPMCE)

Amendment 3

API for SSCOPMCE over Ethernet and UDP port number

Summary

This amendment specifies an Application Programming Interface in C++ for the protocol engine described in ITU-T Rec. Q.2111 Annex E (SSCOP in a Multi-link and Connectionless Environment when operating over Ethernet).

It also assigns the UDP port number for use with SSCOPMCE above UDP in arrangements as specified in Annexes C and D. This UDP port number may be used together with a port number out of the dynamic/private range (values from 49152 through 65535).

Source

Amendment 3 to ITU-T Recommendation Q.2111 (1999) was approved by ITU-T Study Group 11 (2001-2004) under the ITU-T Recommendation A.8 procedure on 14 October 2003.

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

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As of the date of approval of this Recommendation, ITU had 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.

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ITU-T Recommendation Q.2111

B-ISDN ATM adaptation layer – Service specific connection oriented protocol in a multilink and connectionless environment (SSCOPMCE)

Amendment 3

API for SSCOPMCE over Ethernet and UDP port number

1) Clause 2.2 – Bibliography

Add the following reference:

[24] ISO/IEC 14882:2003, *Programming languages – C++*.

2) Clause 5.3 – Modes of operation

Modify the last sentence at the end of the paragraph immediately following Figure 2 and add another sentence to read:

In addition, Annex F provides an Application Programming Interface (API) for SSCOPMCE over Ethernet, specified in Ada. Furthermore, Annex G provides an Application Programming Interface (API) for SSCOPMCE over Ethernet, specified in C++.

3) Clause C.3.2.1 – Description of the UDP upper interface

i) Modify "Source Port" at the end and add another sentence to read:

When present, the numeric value for SSCOPMCE above UDP is either "VALUE TO BE ASSIGNED BY IANA" or value out of the dynamic/private range (values from 49152 through 65535), according to the environment where SSCOPMCE is used.

ii) Modify "Destination Port" at the end and add another sentence to read:

The numeric value for SSCOPMCE above UDP is either "VALUE TO BE ASSIGNED BY IANA" or value out of the dynamic/private range (values from 49152 through 65535), according to the environment where SSCOPMCE is used.

4) Clause D.3.2.1 – Description of the UDP upper interface

i) Modify "Source Port" at the end and add another sentence to read:

When present, the numeric value for SSCOPMCE above UDP is either "VALUE TO BE ASSIGNED BY IANA" or value out of the dynamic/private range (values from 49152 through 65535), according to the environment where SSCOPMCE is used.

ii) Modify "Destination Port" at the end and add another sentence to read:

The numeric value for SSCOPMCE above UDP is either "VALUE TO BE ASSIGNED BY IANA" or value out of the dynamic/private range (values from 49152 through 65535), according to the environment where SSCOPMCE is used.

5) Annex G

Add new Annex G (API for SSCOPMCE over Ethernet) as follows:

Annex G

C++ API for SSCOPMCE over Ethernet

G.1 Introduction

Annex E specifies the deployment of SSCOPMCE on top of the connectionless service provided by IEEE 802.3 Ethernet networks. The primary driver for the configuration is to realize an open-systems databus for closed-loop systems.

Applications can utilize the following services of SSCOPMCE through the SAP offered by the SSCF at the UNI [12]:

- Unacknowledged transfer of data;
- Assured transfer of data;
- Transparency of transferred information;
- Establishment and release of connections for assured transfer of data.

Whereas the main body of the Recommendation and Annex E contain the specifications necessary to develop a product based on an Ethernet network interface card, this annex specifies an application programming interface (API) to the SAP. The reason for specifying an API is to drive development tool and/or real-time operating system vendors to offer a standard, open and familiar interface for software developers to take advantage of the network capabilities offered by an Ethernet-based databus.

G.2 Objectives of the Ethernet Databus API

The Ethernet Databus API is relatively small and self-contained, allowing a programmer to access SSCOPMCE services when such services operate over an Ethernet datalink layer. Two objectives were used in designing an API:

- 1) The API should be based on the notion of sockets, which has been widely used in the majority of existing network APIs for desktop and real-time operating systems. Sockets essentially treat each network connection as a stream into which bytes can be written-to or read-from, allowing them to be an extension of familiar file I/O concepts.
- 2) The API should include provisions for exception-handling in order to manage run-time errors.

G.3 Overview of the Ethernet Databus API Implementation

The Ethernet Databus API is written in the C++ programming language. The choice of C++ is based on its growing use in aerospace and defense systems, one of the application areas driving the specification of Annex E. Consequently, a C++-based API will permit the migration of existing system architectures toward an Ethernet-based databus. In addition, new system architectures may be based on it. Such an API will also offer a standard programming interface for use with an Ethernet-based databus.