Oracle® Communications Network Charging and Control

SIGTRAN m3ua_if Protocol Implementation Conformance Statement

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Contents

About This Document

Scope

This document describes the extent to which the Oracle program m3ua_if conforms with RFC 3332 and RFC 4666 “Signaling System 7 (SS7) Message Transfer Part 3 (MTP3) – User Adaptation Layer (M3UA)”.

As the M3UA protocol implementation is embedded within the m3ua_if program which implements SCCP and TCAP upper layers, there are two separate conformance issues:

1 The conformance of the m3ua_if program as run by Oracle customers.

2 The conformance of the M3UA implementation, as a reusable software library.

Where the M3UA conformance of these two differs, this is noted.

Audience

This document is intended for Oracle and customer staff familiar with the m3ua_if program and the M3UA protocol.

References

- [RFC 3332] IETF RFC 3332. “Signaling System 7 (SS7) Message Transfer Part 3 (MTP3) – User Adaptation Layer (M3UA)”. G. Sidebottom, K. Morneault, J. PastorBalbas.
- [RFC 4666] IETF RFC 4666. “Signaling System 7 (SS7) Message Transfer Part 3 (MTP3) – User Adaptation Layer (M3UA)”. K. Morneault, J. PastorBalbas.

Revision history

Here are the changes to the document.

Version no.	Revision Date	Description
0.1	2006-08-10	Initial Version
0.2	2006-08-31	Update for NTFY and AS handling
0.3	2006-11-22	Update to RFC 4666.
0.4	2010-10-08	Re-format to standard.
05.00	2010-11-11	Re-branded & published

Document Conventions

Format

Section numbers within RFC 4666 are reused within this document. Section numbers from RFC 4666 are omitted if no comment on that section is needed.

Terminology

The phrases “m3ua_if” and “m3ua_if program” refer to the executable binary with that filename, providing a Oracle SLEE TCAP interface to TCAP over SCCP over M3UA.

The phrases “M3UA library” and “M3UA implementation” refer to the Oracle software library implementing the M3UA protocol. The M3UA library is only explicitly referred to where conformance for the library differs from the conformance of the m3ua_if program.

The word “compliant” in this document means that the m3ua_if program behaves in a manner compatible with the relevant requirements of the RFC 4666 text.

Note: RFC 4666 updates and obsoletes RFC 3332. In practice, the differences are minor and do not affect the SIGTRAN stack.

The words “implemented” or “supported” in in this document specifies what parts of the RFC 4666 text are supported by the m3ua_if program. Implemented behaviour may also be described without explicit use of the words “implemented” or “supported”.

In some cases, “compliant” and “implemented” are orthogonal. Compliance does not necessarily imply the implementation of functionality in RFC 4666 that is optional or not applicable. Implemented does not imply compliance, although noncompliance of implemented behaviour is always noted.

Where a configurable m3ua_if parameter is involved in compliance to a requirement, it is assumed that the configuration meets that requirement. Configuring a parameter to an illegal value may silently cause the m3ua_if program to operate in a non-compliant manner.

Similarly, conformance of the M3UA library assumes that it is being used as part of a well-behaved program. A program other than the m3ua_if that uses the M3UA library may deliberately operate in a non-compliant manner.

RFC 4666 contains corrections and minor modifications to RFC 4666. These changes are noted where relevant to the compliance or implementation of the m3ua_if program.

Chapter 1

SIGTRAN m3ua_if PICS

Overview

Introduction

This chapter describes the extent to which Oracle Communications Network Charging and Control (NCC) SIGTRAN m3ua_if complies with RFC 3332 and RFC 4666 “Signaling System 7 (SS7) Message Transfer Part 3 (MTP3) – User Adaptation Layer (M3UA)”.

In this chapter

This chapter contains the following topics.

1. [RFC 4666] Introduction

1.1 Scope

The m3ua_if program implements an AS(P), which plays a network role similar to an MGC as opposed to a SG.

Where the m3ua_if program connects directly to another ASP, some SG functionality is supported.

The M3UA library is not limited to a particular network role, but support for SG functionality is limited.

1.2 Terminology

Compliant.

1.3 M3UA Overview

1.3.1. Protocol Architecture

The m3ua_if program uses SCTP transport by default, but TCP transport is also supported.

1.3.2. Services Provided by the M3UA Layer

1.3.2.1. Support for the Transport of MTP3-User Messages

The m3ua_if program does not enforce a 272octet block size.

1.3.2.2. Native Management Functions

Compliant.

1.3.2.3. Interworking with MTP3 Network Management Functions

Not compliant, because not an SG.

1.3.2.4. Support for the Management of SCTP Associations between the SGP and ASPs

The M3UA library maintains a collection of SCTP connections to peers. There is no particular functionality for establishing a single SCTP connection at a time; however the library may have its entire configuration replaced dynamically, resulting in SCTP connections being created or shutdown.

1.3.2.5. Support for the Management of Connections to Multiple SGPs

The m3ua_if program maintains state is maintained for peers accessed via SGPs with some limitations: only when the SGPs are explicitly listed as STPs. If the generic SIGTRAN routing is used to direct traffic for a peer to an SGP, the state is not maintained.

1.4. Functional Areas

1.4.1. Signalling Point Code Representation

The m3ua_if program does not support multiple network appearances. A single network appearance value may be configured per connection.

1.4.2. Routing Contexts and Routing Keys

1.4.2.1. Overview

The m3ua_if program is not a SG, and does not support dynamic routing key management. Thus only routing contexts are processed by the m3ua_if program.

1.4.2.2. Routing Key Limitations

Compliant.

1.4.2.3. Managing Routing Contexts and Routing Keys

Not an SG.

1.4.2.4. Message Distribution at the SGP

Not an SG.

1.4.2.5. Message Distribution at the ASP

Compliant.

Within the m3ua_if program, the choice of possible destinations for a message is based on both point-code, SLS and TCAP transaction state. The M3UA library is not aware of TCAP transactions.

1.4.3. SS7 and M3UA Interworking

The m3ua_if program does not connect directly to SS7 networks.

1.4.4. Redundancy Models

We do not implement any redundancy models.

1.4.5. Flow Control

The m3ua_if program does not provide flow control beyond that provided by the SCTP layer.

1.4.6. Congestion Management

The m3ua_if program does not send SCON messages.

The M3UA library makes congestion management packets available to MTP3 users.

1.4.7. SCTP Stream Mapping

Compliant.

DATA messages are never sent on stream zero.

All other packets are always sent on stream zero.

1.4.8. SCTP Client/Server Model

Both client and server operation are supported. This is configurable, as is the port number.

1.5. Sample Configuration

1.5.1. Example 1: ISUP Message Transport

Not compliant.

1.5.2. Example 2: SCCP Transport between IPSPs

Not compliant.

1.5.3. Example 3: SGP Resident SCCP Layer, with Remote ASP

Compliant.

- SEP = MSC
- SPG = ITP
- ASP = Service Logic Controller
- SCCP-User = slee_acs or xmsTrigger

1.6. Definition of M3UA Boundaries

The m3ua_if program and M3UA library do not follow the internal software design that might be inferred from this section.

The M3UA library makes the underlying packets visible to a MTP3 user as appropriate, in addition to providing appropriate processing of those packets.

2. Conventions

Nothing to comply to.

3. M3UA Protocol Elements

Introduction

Compliant.

Note that compliance in section 3 in general only covers packet formatting and does not indicate any particular level of compliance with the procedures using those packets.

The M3UA library can parse and format all RFC 4666 packets and parameters. Some procedures involving those packets are implemented within the M3UA library; other packets are simply made available to users of the library.

Where the m3ua_if program does not support procedures using a particular packet or parameter, compliance in this section merely results in an appropriate error code being returned on receipt.

3.1. Common Message Header

Compliant.

3.1.1 M3UA Protocol Version: 8 bits (unsigned integer)

Compliant.

3.1.2 Message Classes and Types

Compliant.

3.1.3 Reserved: 8 Bits

Compliant.

3.1.4. Message Length

Compliant.

A message with incorrect parameter formatting will be rejected irrespective of this section.

3.2. Variable Length Parameter Formatting

Compliant.

Parameters are accepted in any order.

Parameters are always sent in the order listed in RFC 4666.

3.3. Transfer Messages

3.3.1. Payload Data Message (DATA)

Compliant.

3.4. Signalling Network Management (SNM) Messages

Compliant. However, the m3ua_if program is not a SG, so the requirements imposed by this section are minimal.

3.5. ASP State Maintenance (ASPSM) Messages

Compliant.

3.5.1. ASP Up

Compliant.

3.5.2. ASP Up Acknowledgement (ASP Up Ack)

Compliant.

3.5.3. ASP Down

Compliant.

3.5.4. ASP Down Acknowledgement (ASP Down Ack)

Compliant.

3.5.5. Heartbeat (BEAT)

Compliant. BEAT messages are not sent (instead, SCTP heartbeats are enabled if configured). BEAT messages are responded to.

3.5.6. Heartbeat Acknowledgement (BEAT Ack)

Compliant.

3.6. Routing Key Management (RKM) Messages [Optional]

3.6.1 Registration Request (REG REQ)

Not used.

3.6.2. Registration Response (REG RSP)

Not used.

3.6.3. Deregistration Request (DEREG REQ)

Not used.

3.6.4. Deregistration Response (DEREG RSP)

Not used.

3.7. ASP Traffic Maintenance (ASPTM) Messages

3.7.1. ASP Active

Compliant.

3.7.2. ASP Active Acknowledgement (ASP Active Ack)

Compliant.

3.7.3. ASP Inactive

Compliant.

3.7.4. ASP Inactive Acknowledgement (ASP Inactive Ack)

Compliant.

3.8. Management (MGMT) Messages

3.8.1. Error

Compliant with the exception that neither the “Invalid Stream Identifier” nor the “Invalid Routing Context” errors are sent. The SCTP stream number, and the incoming routing context, are not checked.

4. Procedures

4.1. Procedures to Support the M3UA-User

4.1.1. Receipt of Primitives from the M3UA-User

Compliant.

4.2. Receipt of Primitives from the Layer Management

Compliant.

SCTP connections are (re)configured en-masse rather than individually.

The M3UA library notifies layer management of state changes via a generation counter rather than via explicit notification.

4.2.1. Receipt of M3UA Peer Management Messages

Compliant.

Nontransfer messages are always sent on stream 0.

4.3. AS and ASP/IPSP State Maintenance

Both the single exchange and double exchange model are supported.

4.3.1. ASP/IPSP States

Compliant.

4.3.2. AS States

The m3ua_if program is not a SG; while the T(r) timer is implemented for the purposes of sending NTFY packets, packets are not queued.

Otherwise compliant.

A non-override AS is activated immediately when the local ASP reaches the UP state. An override AS is activated based upon the NTFY packets from the SGP.

4.3.3. M3UA Management Procedures for Primitives

Compliant.

When acting as an SCTP client, a SCTP reconnection attempt is made 5 seconds after the connection is disconnected (or after a previous unsuccessful connection attempt).

4.3.4. ASPM Procedures for Peer-to-Peer Messages

4.3.4.1. ASP Up Procedures

Compliant.

4.3.4.1.1. M3UA Version Control and ASP Up

Compliant.

4.3.4.2. ASP-Down Procedures

Compliant.

4.3.4.3. ASP-Active Procedures

For sending ACTIVE packets, we only support a single routing context per connection.

When receiving ACTIVE packets, we accept any routing contexts. We do not enforce any particular routing context values; we allow a remote ASP to use any routing context value whatsoever.

We send a single ACTIVE ACK message per received ACTIVE message.

4.3.4.4. ASP Inactive Procedures

Although the m3ua_if program generates NTFY packets using the T(r) timer, the queuing of traffic in pending state is not implemented.

4.3.4.5. Notify Procedures

Compliant.

4.3.4.6. Heartbeat procedures

Compliant. We respond to incoming heartbeat packets. We do not send heartbeat packets; instead SCTP heartbeats are used.

4.4. Routing Key Management Procedures

Routing key management is not supported.

4.5. Procedures to Support the Availability or Congestion Status of SS7 Destination

4.5.1. At an SGP

The m3ua_if program is not an SGP.

4.5.2. At an ASP

The route status of a destination accessed via a STP is maintained. If traffic is routed to a peer (which may be an SGP) without using the STP mechanism, then the state is not maintained.

5. Examples of M3UA Procedures

These are just examples, so no compliance statement required.

6. Security Considerations

Neither IP Security nor TLS is used. Security must be on the SG.

7. IANA Considerations

7.1. SCTP Payload Protocol Identifier

Compliant. The PPID value 3 is always used.

7.2. Port Number

Compliant. The port numbers are configurable and 2905 may be used.

7.3. M3UA Protocol Extensions

We do not extend the protocol.

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