N-Squared Software N2SVCD
SIGTRAN-TCAP Protocol Conformance Statement

Version 2021-03

1 Document Information

1.1 Scope and Purpose

This document describes the implementation of the SIGTRAN and TCAP protocols for all N-Squared applications, at this time consisting of:

- N2INT – Supporting INAP/CAMEL/MAP for the N2 IN Tester.
- N2SRP – Supporting INAP/CAMEL for the N2 Specialized Resource Platform.
- N2DSG – Supporting INAP/CAMEL for the N2 Diameter/Signalling Gateway.

This document assumes a working knowledge of the relevant telephony concepts.

1.2 Definitions, Acronyms, and Abbreviations

Term	Meaning
AC	Application Context (in TCAP)
ARI	Assist Request Instructions
AS	Application Server
ASP	Application Server Process
ASPAC	ASP Active
ASPTM	ASP Traffic Maintenance
ASN.1	Abstract Syntax Notation One
CAMEL	Customized Applications for Mobile Network Enhanced Logic
CAP	CAMEL Application Part
DTMF	Dual Tone Multi-Frequency
ETSI	European Telecommunications Standards Institute
GT	Global Title
GTI	Global Title Indicator
IETF	Internet Engineering Task Force
INAP	Intelligent Networking Application Part
IP	Internet Protocol
ITU-T	International Telecommunication Union Telecommunication Standardization Sector
M3UA	MTP3 User Adaption Layer
MTP3	Message Transfer Part Level 3
N2	N-Squared
OCNCC	Oracle Communications Network Charging & Control
PA	Play Announcement
PACUI	Prompt And Collect User Information
PC	Point Code
RFC	Request For Comments
RI	Routing Indicator
RTP	Real-Time Transport Protocol
SCCP	Signalling Connection Control Part
SCP	Service Control Platform

Term	Meaning
SCTP	Stream Control Transmission Protocol
SIP	Session Initiation Protocol
SLC	Service Logic Controller
SRP	Specialized Resource Platform
SRR	Specialized Resource Report
SSN	Sub-System Number
SSP	Service Switching Platform
SUA	SCCP User Adaption Layer
TCAP	Transaction Capabilities Application Part
TS	Technical Specification

1.3 References

The following documents are referenced within this document:

Reference	Document
[R-1]	N2SVCD Technical Guide
[R-2]	N-Squared N2SRP INAP PCS
[R-10]	ITU-T Q.773 Transaction capabilities formats and encoding
[R-11]	IETF RFC 4666 Signaling System 7 (SS7) Message Transfer Part 3 (MTP3) - User Adaptation Layer (M3UA)
[R-12]	IETF RFC 3868 Signalling Connection Control Part User Adaptation Layer (SUA)

1.4 Ownership and Usage

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2 Contents

3 Introduction

3.1 N2SVCD Overview

The N-Squared Service Daemon (N2SVCD) is the common base framework underlying the N-Squared SIGTRAN and SIP-based telephony products. This document describes the SIGTRAN and TCAP Protocol Conformance Statement common to all N-Squared SIGTRAN solutions, including.

- N2INT – N-Squared IN Tester.
- N2SRP – N-Squared Specialized Resource Platform (INAP-Controlled IVR).
- N2DSG-CAMEL – N-Squared Diameter/Signalling Gatway (CAMEL variant).

E.g. consider the standard N2SRP integration diagram:

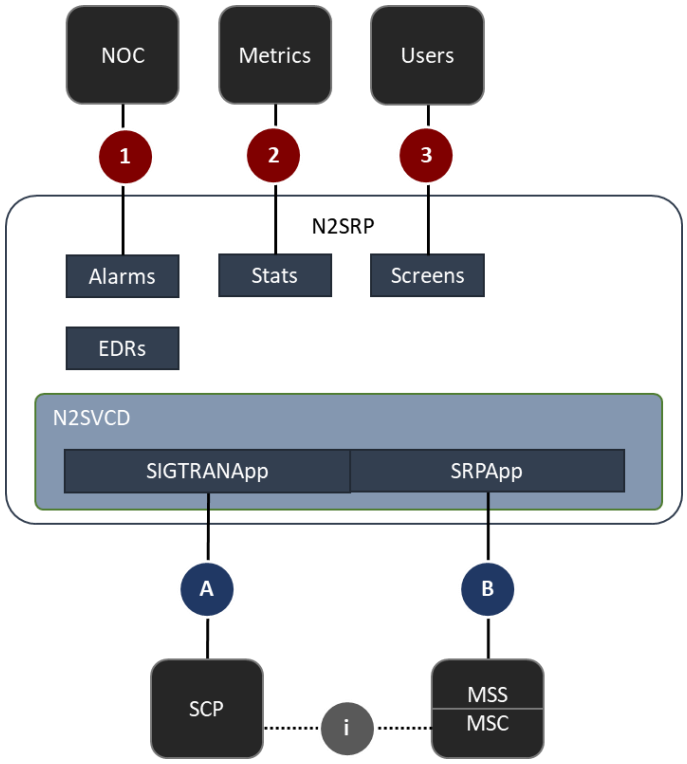

Figure A: Example Integration (N2SRP)

This document relates to the N2SVCD Compliance for Interface "A", which has the following stack:

- INAP (or CAP)
- **TCAP**
- **SCCP**
- **SIGTRAN M3UA**
- **SCTP/IP**

Specifically, this document describes the layers from TCAP and below. The upper INAP (or CAP) layer is described in separate document for each application, e.g. [R-2] for N2SRP.

Conformance is based on the referenced standards or other non-standard functionality but noting that solution conformance to the above is limited to the extent expressly described herein. I.e. statement of conformance to a standard in no way implies conformance to or compliance with the complete standard.

4 TCAP Compliance

N2SRP implements a TCAP layer based on the ITU-T Q.77x family of documents, specifically Q.773 [R-10].

4.1 TCAP Primitives

The following compliance is implemented for TCAP primitives:

Primitive	Notes
TC-UNI	Not Supported
TC-BEGIN	Supported
TC-CONTINUE	Supported
TC-END	Supported
TC-U-ABORT	Supported
TC-P-ABORT	Supported
Pre-Arranged End	Supported

Table 1: TCAP Primitive Compliance

4.2 TCAP Dialogue

The following TCAP dialogue attributes are supported.

Attribute	Notes
Application Context	Supported in TCAP BEGIN, (first) CONTINUE/END
Originating Transaction ID	Supported in TCAP BEGIN, CONTINUE
Destination Transaction ID	Supported in TCAP CONTINUE, END, ABORT
AARQ-apdu	Supported in TCAP BEGIN
protocol-version	Supported
application-context-name	Supported
user-information	Supported for MAP only
single-ASN1-type	Supported for MAP only
map-open	Supported for MAP only
destinationReference	Supported for MAP only
originationReference	Supported for MAP only
AARE-apdu	Supported in TCAP (first) CONTINUE/END
application-context-name	Supported
result	Supported
result-source-diagnostic	Supported
dialogue-service-user	Supported
dialogue-service-provider	Supported

Table 2: TCAP Dialogue Compliance

4.3 TCAP Components

The following TCAP component types are supported as indicated.

Not all component types are supported for all MAP/INAP/CAP operations.

Component Type	Notes
Invoke	Supported in TCAP BEGIN, CONTINUE, END
ReturnResult	Supported in TCAP CONTINUE, END
ReturnError	Supported in TCAP CONTINUE, END
Reject	Supported in TCAP CONTINUE, END

Table 3: TCAP Component Compliance

5 SCCP & M3UA/SUA Compliance

N2SRP implements both:

- SCCP over M3UA using IETF RFC 4666 [R-11].
- SUA using IETF RFC 3868 [R-12].

5.1 M3UA Message Types

The following compliance is implemented for M3UA messages:

M3UA Message	Receive	Send
MGMT : ERR	Supported	Not Supported
MGMT : NTFY	Supported (AS-State Change only)	Supported (AS-State Change only)
Transfer : Data	Supported	Supported
ASPSM: ASPUP	Supported	Supported
ASPSM: ASPDOWN	Supported	Supported
ASPSM: BEAT	Supported	Not Supported
RKM: *	Not Supported	Not Supported
ASPTM: ASP Active	Supported	Supported
ASPTM: ASP Inactive	Supported	Supported
SNM: DAUD	Supported (IPSP only)	Supported
SNM: DUNA	Supported	Supported (IPSP only)
SNM: DAVA	Supported	Supported (IPSP only)
SSNM: SCON	Ignored	Not Supported
SSNM: DUPU	Ignored	Not Supported
SSNM: DRST	Ignored	Not Supported

Table 4: M3UA Message Type Compliance

5.1.1 SSNM: DAUD

In Application Server (“as” mode) for M3UA connections the AS will send SSNM: DAUD if and only if any Concerned PCs are locally configured.

Parameter	Send
ROUTING_CONTEXT	Included if known
NETWORK_APPEARANCE	Not Supported
AFFECTED_POINT_CODES	Included Note that “mask” is never used.

5.1.2 SSNM: DUNA

In Application Server ("as" mode) for M3UA connections the AS will accept SSNM: DUNA for concerned point codes notified by the SG, either solicited by SSNM: DAUD or unsolicited.

Parameter	Send
ROUTING_CONTEXT	Must match configured RC value
NETWORK_APPEARANCE	Ignored
AFFECTED_POIINT_CODES	Supported Note that "mask" is not supported.

5.1.3 SSNM: DAVA

In Application Server ("as" mode) for M3UA connections the AS will accept SSNM: DAVA for concerned point codes notified by the SG, either solicited by SSNM: DAUD or unsolicited.

Parameter	Send
ROUTING_CONTEXT	Must match configured RC value
NETWORK_APPEARANCE	Ignored
AFFECTED_POIINT_CODES	Supported Note that "mask" is not supported.

5.2 SUA Message Types

The following compliance is implemented for SUA messages:

M3UA Message	Receive	Send
MGMT: ERR	Supported	Not Supported
MGMT: NTFY	Supported (AS-State Change only)	Supported (AS-State Change only)
Connectionless: CLDT	Supported	Supported
Connectionless : CLDR	Not Supported	Not Supported
ASPSM: ASPUP	Supported	Supported
ASPSM: ASPDOWN	Supported	Supported
ASPSM: BEAT	Not Supported	Not Supported
RKM: *	Not Supported	Not Supported
ASPTM: ASPAC	Supported	Supported
ASPTM: ASPIA	Supported	Supported
SNM: DAUD	Supported (IPSP only)	Supported
SNM: DUNA	Supported	Supported (IPSP only)
SNM: DAVA	Supported	Supported (IPSP only)
SNM: SCON	Ignored	Not Supported
SNM: DUPU	Ignored	Not Supported
SNM: DRST	Ignored	Not Supported

Table 5: SUA Message Type Compliance

5.2.1 SSNM: DAUD

Same as M3UA.

5.2.2 SSNM: DUNA

Same as M3UA.

5.2.3 SSNM: DAVA

Same as M3UA.

5.3 SCCP UnitData Types

The following compliance is implemented for SCCP UnitData types:

M3UA Message	Receive	Send
SCCP-UDT	Supported	Supported
SCCP-XUDT	Not Supported	Not Supported
SCCP-LUDT	Not Supported	Not Supported

Table 6: SCCP UD Types

5.4 SCCP Connection Classes

The following compliance is implemented for SCCP connection classes:

SCCP Connection Class	Receive	Send
Class 0	Supported	Supported
Class 1	Supported	Supported
Class 2	Not Supported	Not Supported
Class 3	Not Supported	Not Supported

Table 7: SCCP Connection Classes

5.5 SCCP Addressing

The N2SRP supports SCCP routing on PC + SSN, and/or GT.

The following compliance is implemented for the RI and GTI SCCP address indicators:

SCCP Address Type	Receive	Send
RI = 0	Supported	Supported
RI = 1	Supported	Supported
GTI = 0	Supported	Supported
GTI = 1	Supported	Supported
GTI = 2	Supported	Supported
GTI = 3	Supported	Supported
GTI = 4	Supported	Supported

Table 8: SCCP Addressing

5.6 M3UA ASPTM/ASPAC Traffic Mode

The following compliance is implemented for M3UA ASPTM/ASPAC Traffic Mode.

Traffic Mode	Receive	Send
1 = Override	Ignored	Supported
2 = Loadshare	Supported	Supported (Default)
3 = Broadcast	Ignored	Supported

Table 9: M3UA ASPTM/ASPAC Traffic Mode