

ISITEP

D4.2.1 - E1 ISI TETRA GATEWAY INTERFACE DESIGN DOCUMENTATION

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V0.1		All	All	First draft
V0.2		3, 8, 9 and 10	4.2, 4.3 and 4.4	Updated with received comments
V1.0				Review comments adopted

Publishable extended abstract

This Document is for Task 4.2.1 “E1 ISI TETRA gateway interface design documentation”.

The objective of the E1 ISI TETRA gateway interface is to allow TETRA networks, that provide current TETRA ISI standard interface (E1/QSIG/ROSE based) to be interconnected to TETRA networks, that provide an IP based ISI, as being defined in ISITEP WP4.1. The upper layers of the ETSI ISI standard remain unchanged and their interoperability is handled in ISITEP WP4.7, beyond the scope of this document.



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1. INTRODUCTION

1.1 Introduction

One of the goals for the ISITEP program is define how Inter System Interface (ISI) signalling between TETRA SwMIs can be conveyed in an SIP/IP network. The current ISI specifications describe how ISI signalling is conveyed in a QSIG/E1 network where the ISI signalling is included in Facility information elements. In order for the systems complying to the current standard to interconnect with the systems complying with the future standard a converter is to be introduced.

In 4.1.1 a definition of ISI over IP will be performed. In this protocol definition the ETSI ISI QSIG ROSE / E1 layer will be translated into SIP / IP protocol suite

One of the requirements towards the ISITEP program is that the ISI messages shall be unchanged and independent on the transport media.

2. DESCRIPTION

The ISI Gateway for the QSIG/E1 to SIP/IP is a conversion entity and shall not maintain ISI states. Each of the protocols stacks are independent and shall reflect the transport protocol states of the two connected TETRA systems.

The ISI messages are carried in

- The Facility information element in QSIG messages
- The body part in SIP messages

3. FUNCTIONAL REQUIREMENTS

The ISI messages shall be transferred unchanged to/from the QSIG Facility information element from/to the SIP message body part.

3.1 ISI protocol adaptation on transport protocol

The gateway shall monitor the links state on both side of the gateway, if a link failure is detected all protocol instance shall be released impacted by the link failure.

If a protocol state cannot be maintained toward one of the links, the protocol instance on the other links shall be disconnected, there shall not be any ISI signalling added by the Gateway.

The gateway shall maintain a mapping of the Invoke ID at from the QSIG/ROSE interface header towards the ISI header on the SIP/IP interface.

The Gateway shall per call instance maintain a mapping of the QSIG slot to SIP/SDP descriptor for routing of the Audio.

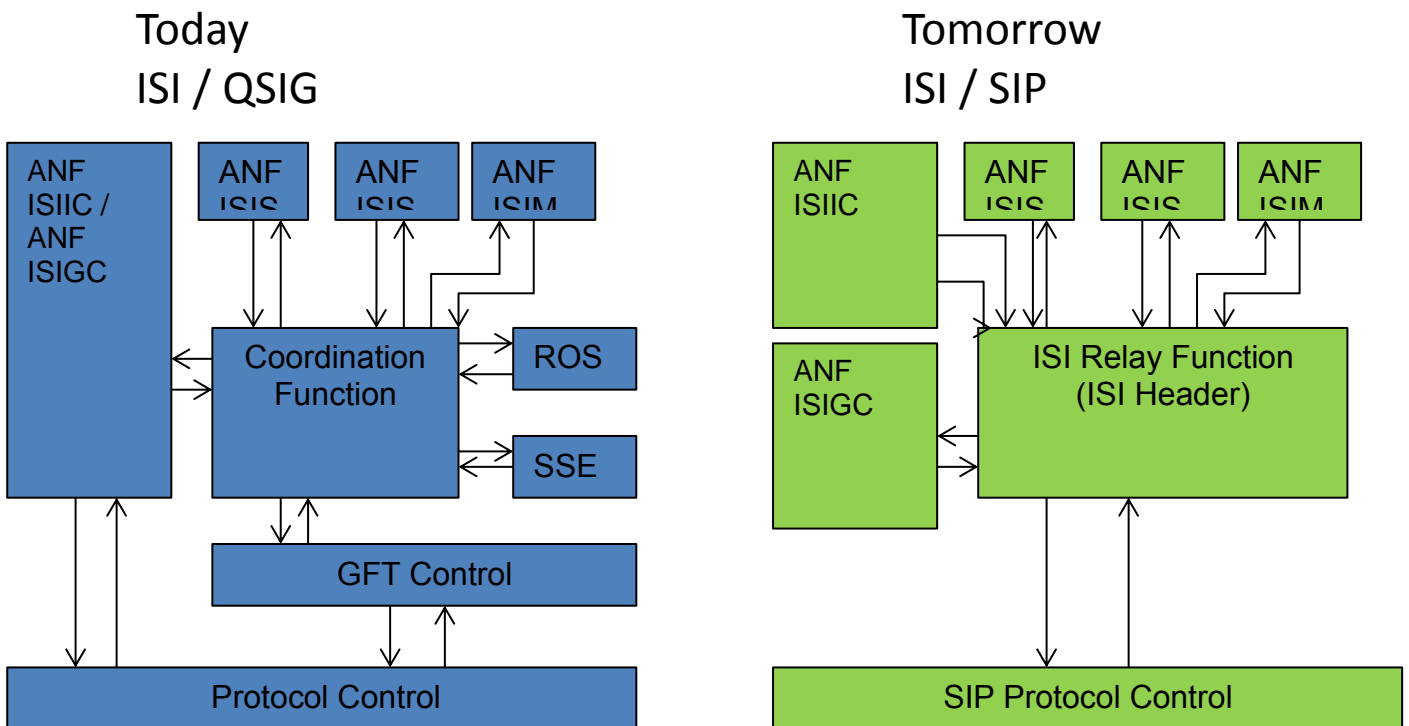


Figure 1 - Protocol Layers

3.1.1 QSIG/E1 Interface

When the Gateway is sending ISI messages over the QSIG/E1 connection, the Gateway shall bind the ISI to PSS1 as specified in the ETSI TETRA ISI standards ETSI EN 300 392-3-x.

- EN 300 392-3-1: "General design";
- EN 300 392-3-2: "Additional Network Feature Individual Call (ANF-ISIIC)";
- EN 300 392-3-3: "Additional Network Feature Group Call (ANF-ISIGC)";
- EN 300 392-3-4: "Additional Network Feature Short Data Service (ANF-ISISDS)";
- EN 300 392-3-5: "Additional Network Feature Mobility Management (ANF-ISIMM)";
- TS 300 392-3-8: "Generic Speech Format Implementation";

The ISI functionality shall follow the TCCA agreed TIP's for ISI Inter-System Interface Specifications (003)

- TTR003-01_vxxx_IMM: "01 Mobility Management"
- TTR003-02_vxxx_IIC: "02 Individual Call"
- TTR003-03_vxxx_ISD: "03 Short Data Service"
- TTR003-04_vxxx_ILL: "04 Lower Layers"
- TTR003-05-3_vxxx_ISFG: "05 Speech Format"
- TTR003-06_vxxx_IGC: "06 Group Call"

The gateway shall support PSS1 signalling as defined in ECMA143 and ECMA165.

It shall be configurable if the gateway shall act as side "A" or side "B" as described in ECMA143 clause 10.3.

The gateway shall follow the E1 clock from the E1 based SwMI.

3.1.2 SIP/IP Interface

When the Gateway is sending ISI messages over the SIP/IP connection, the Gateway shall follow the ISI to SIP binding; the ISI to SIP binding will be specified in work item D4.1.1. (Work ongoing)

The gateway shall support the following RFCs:

- RFC 3261 Session Initiation Protocol (SIP)
- RFC3428 SIP Extension for Instant Messaging
- RFC 4028 Session Timer
- RFC 5621 Message Body Handling in SIP
- RFC 6026 Correct Transaction Handling for 2xx Responses to SIP Invite Requests
- RFC 6086 INFO and INFO Package Framework
- RFC 6141 Re-Invite Handling

The following RFCs must be supported for the ACELP Audio transported via SDP:

- RFC 3264 SDP Offer/Answer Method
- RFC 4566 SDP

For the audio path only unicast shall be supported

The ACELP Audio stream at the QSIG/E1 interface shall follow the speech transport delay requirements of TTR003-05-3_v100_ISFG, which require a maximum jitter of 5 ms.

4. ARCHITECTURE REQUIREMENTS

4.1 Network Management

The gateway shall be configured from a network management application. The management interface is based on SNMP.

Configuration of the gateway shall include:

- The gateway shall have a service IP address.
- Configuration of the SIP/IP instance
 - Source IP Address
 - Destination IP Address
 - Signalling Port
 - Next Hop for Firewall
 - SIP/SDP configuration
- Configuration of the QSIG/E1 instance
 - Source PISN
 - Destination PISN
 - Traffic channel selection method
 - LAPD configuration
- HW configuration
 - Number of active E1 links

It shall be possible to fault manage the gateway from an external fault management application.

Managed objects shall be:

- Gateway
- E1 connection
- IP connection

4.2 Security

The Gateway will transport Authentication key material, Voice and Data. This requires that the Gateway implementation shall be done following secure coding standards.

There are secure programming standards like Klockwork <http://www.klocwork.com/solutions/security-coding-standards/> or DISA STIGS <http://iase.disa.mil/stigs/app-security/app-security/Pages/app-security.aspx>.

The SPGF recommendation for ISI connection shall be applied for the links, supporting a Bulk load encryption on the E1 interface.

At the IP interface a Firewall shall be supported and the IP connection shall be secure ex. IPSEC.

There can be additional secure requirements for the Gateway and the system interfaces this will be specified in ISITEP D2.2.3

4.3 Capacity

It shall be possible to add more than one Gateway between two TETRA networks. A single Gateway will depend on HW selection have a finite number of E1 connections.

A single Gateway shall be able to support 4 E1 links, in the ISITEP project redundancy will be done per E1 bases.

4.4 Deployment

The Gateway shall be able to be deployed independent of the two connected TETRA systems.