

Appendix N – Technical Description (eCall / NG eCall router)

1. Requirements/standards under EU law, and the current situation

1.1 eCall (in-band, CS - Circuit Switched)

EU law:

26.11.2012 European Commission Delegated Regulation No 305/2013

29.04.2015 Regulation of the European Parliament and of the Council No 2015/758

15.05.2014 Decision of the European Parliament and of the Council No 585/2014/EU

12.09.2016 European Commission Delegated Regulation No 2017/79

Standards:

EN 16072:2015 „Intelligent transport systems - eSafety - Pan-European eCall operating requirements“;

EN 16062:2015 „Intelligent transport systems - eSafety - eCall high level application requirements“;

EN 16454:2015 „Intelligent transport systems - eSafety - eCall end to end conformance testing “;

EN 15722:2015 „Intelligent transport systems - eSafety - eCall minimum set of data “.

In 2017, SMIT procured a so-called “**eCall (In-Band)**” hardware solution that met the above requirements from the bidder Datus AG through a public procurement (eCall-Decoder – see <https://www.datus.com/notruf-systeme>). The solution was integrated with the Mitel phone system/”old” call solution used by the Emergency Support Center’s 112 service and with the SOS information system. It was taken into use in 2018. By now, the procured hardware solution has been working for 8 years and needs to be updated or replaced.

1.2 NG eCall (IMS/SIP, PS – Packet Switched)

EU law:

06.02.2024 European Commission Delegated Regulation No 2024/1084

14.02.2024 European Commission Delegated Regulation No 2024/1180

23.07.2025 European Commission Delegated Regulation No 2025/1871

Standards:

EN 16072:2025 „Intelligent transport systems - eSafety - Pan-European eCall operating requirements“;

EN 16062:2023 „Intelligent transport systems - eSafety - eCall high level application requirements using GSM/UMTS circuit switched networks “

EN 17184:2024 „Intelligent transport systems - eSafety - eCall high level application protocols using IP Multimedia Subsystem (IMS) over packet switched networks“;

EN 16454:2023 „Intelligent transport systems - eSafety - eCall end to end conformance testing “;

EN 17240:2024 „Intelligent transport systems - eSafety - eCall end to end conformance testing for IP Multimedia Subsystem (IMS) packet switched based systems“

EN 15722:2020 „Intelligent transport systems - eSafety - eCall minimum set of data “.

At the end of 2025, SMIT procured hardware for testing both eCall and NG eCall calls (provider OECON Products & Services GmbH – manufacturer Kontron AG - see <https://www.kontron.com/en/products/ngecall-test-and-validation/p188189>), a so-called “analogue” for the IVS system. Working with the communication operators, the first tests were carried out for moving the connections used by the Emergency Response Center voice communication over to IMS connections.

The plan for 2026 is to move all the connections presently in use by the operators and the Emergency Response Center 112 voice communication over to IMS connections and to procure an eCall software solution that is in compliance with the aforementioned standards (the present procurement) and supports both eCall (in-band, CS) and NG eCall (IMS/SIP, PS). In the end of 2026, the plan is to integrate the new eCall/NG eCall solution with the 112 Call Solution of the Emergency Response Center in development by SMIT and with the existing SOS information system. As soon as possible, the whole solution should be in use.

Estonian communication operators will not support (NG) eCall calls in SIP 4G/5G SIP calls before the implementation of NG eCall solution. The IVS systems of new vehicles that follow the new NG eCall standards must also be able to execute eCall calls in 2G networks (3G network is closed in Estonia) which has been supported by the operators and the Emergency Response Center since 2018.

2. Description of necessity

Considering the needs of the Emergency Response Center, SMIT wishes to replace the old eCall Decoder solution (in-band, CS), dependent on separate special hardware, with a new software solution that supports both eCall (in-band, CS) and NG eCall (IMS/SIP, PS) calls.

NB – the eCall (in-band) call received by SMIT from the mobile network operator is always done so as a SIP call, regardless that the call between the IVS and the operator is in 2G (the connection between the operator and SMIT is IMS and SIP based).

The procured solution must conform, in addition to what is described in the current and upcoming chapters, to the standards described in chapter 1 in so much as these regulate the receiving of eCall (in-band, CS) and NG eCall (IMS/SIP, PS) calls at the Emergency Response Center.

2.1 Abbreviations

112 Workstation - (PSAP Workstation). The computer workstation of the rescue coordinator of the Emergency Response Center, equipped with the 112 Call Solution and the SOS information system.

112 Call Solution – the new 112 Call Solution of the Emergency Response Center in development by SMIT. Includes the Location Information System (LIS).

112 Phone System – (112 IP PBX) the new phone system at the Emergency Response Center (Asterisk IP PBX).

API – Application Programming Interface. A collection of rules and protocols that allow different software components to communicate and share data with each other.

CS – Circuit Switched communication technology. The traditional telecommunications method (e.g., 2G) where a dedicated communications channel is created for the duration of the call. Used in eCall (in-band) calls.

DC – Data Center.

IMS – IP Multimedia Subsystem. An architectural framework that allows delivering IP-based multimedia services (e.g., VoLTE and NG eCall) within mobile networks.

IP PBX – Internet Protocol Private Branch Exchange. A software-based communication server (e.g., Asterisk) that handles voice communications over IP network using SIP protocol.

IVS – In-Vehicle System. A car on-board device that can detect vehicular accidents, create an emergency call and transmit MSD.

LIS – Location Information System. A solution for handling the location information of the initiator of the emergency notification (call, eCall, SMS) and for transmitting it to the management system of the Emergency Response Center.

MSD – Minimum Set of Data. Standardized (see standard EN 15722:2020) digital data block (location, VIN etc.) that is sent from a vehicle to the Emergency Response Center during an eCall/NG eCall call.

MNO – Mobile Network Operator.

MQ – Message Queue server. Enables inter-system asynchronous data communication.

PS – Packet Switched communication technology. A telecommunications method where data is transmitted as packets over an IP network (4G/5G). NG eCall works over a PS-network.

PSAP – Public Safety Answering Point. Emergency Response Center.

SBC – Session Border Controller. A network device that secures and handles SIP-based traffic and distributes calls between servers.

SIP – Session Initiation Protocol. Standard protocol for handling multimedia-sessions (sound, video, data) within IP-networks. Used in NG eCall calls.

SOS – the existing information system of the Emergency Response Center used for handling emergency events and for managing and dispatching resources to the location of the emergency.

VM – Virtual Machine (server).

2.2 Functionality

- 1) The solution must support eCall (in-band, CS) calls so that:
 - a. In case of an incoming eCall call:
 - i. Answers the incoming eCall (in-band) call;
 - ii. Decodes the MSD transmitted in the audio stream (in-band); depending on whether the CRC matches or doesn't match, sends or doesn't send an ACK in audio;
 - iii. After MSD decoding, forwards the call to 112 Phone System (Asterisk IP PBX);
 - iv. Transmits the decoded MSD to the 112 Call Solution via its interface*;
 - v. Provides a service through its API to initiate a new MSD query during an active incoming eCall (in-band) call; it returns the result (MSD) to the query via the API or outputs it asynchronously to the 112 Call Solution via the interface*.
 - b. In case of a callback (outgoing) call initiated by the Emergency Response Center to the IVS with eCall (in-band, CS) capability:
 - i. Enables the 112 Phone System to initiate a callback (outgoing) call to the IVS device with eCall (in-band) capability;
 - ii. If possible, automatically initiates an MSD query (in-band) at the start of the callback (outgoing) call and transmits the result to the 112 Call Solution via its interface*;
 - iii. Provides a service through its API to initiate a new MSD query during an active callback (outgoing) call; it returns the result (MSD) to the query via the API or outputs it asynchronously to the 112 Call Solution via the interface*.
- 2) The solution must support NG eCall (IMS/SIP, PS) calls so that:
 - a. In case of an incoming NG eCall call:
 - i. Answers the incoming NG eCall call (INVITE message reception, including standard validation of its content);
 - ii. Reads the MSD field from the body of the SIP INVITE message; when responding to the INVITE message with a 200 OK, the data representing the "result" of reading the MSD field is included in the body of the message, in accordance with the standard (adds/fills in „Content-Type: application/EmergencyCallData.Control+xml“, including reporting a "Success" or "Error" status in the <MSD_Status> field);
 - iii. After reading the MSD, forwards the call to 112 Phone System;
 - iv. Transmits the MSD received from the INVITE body in SIP to the 112 Call Solution via its interface*;
 - v. Provides a service through its API to initiate a new MSD query (includes sending an INFO message with an appropriate body and processing the response) during an active incoming NG eCall (in-SIP) call, or the ability to configure a periodic query during the active incoming call (e.g., after every 30 or 60 sec). It returns the result (MSD) to the query via the API or outputs it asynchronously to the 112 Call Solution via the interface*.
 - b. In case of callback (outgoing) call by the Emergency Response Center to the IVS:
 - i. Enables the 112 Phone System to initiate a callback (outgoing) call to the IVS device with NG eCall (IMS/SIP) capability;
 - ii. If possible, automatically initiates an MSD query (in-SIP) at the start of the callback (outgoing) call and transmits the result to the 112 Call Solution via its interface*;
 - iii. Provides a service through its API to initiate a new MSD query (in-SIP) during an active callback (outgoing) call, or the ability to configure a periodic query during the active outgoing call (e.g., after every 30 or 60 sec). It returns the result (MSD) to the query via the API or outputs it asynchronously to the 112 Call Solution via the interface*.

* - The integration of the 112 Call Solution with the provider's interface is developed and implemented by SMIT. This includes creating a REST service for receiving MSD that complies with the specifications provided by the provider or establishing and maintaining a connection with a message queue (MQ) and consuming MSD messages from it.

3) Call audio encoding

a) The minimum supported codec is G.711 for both eCall and NGeCall.

2.3 Solution type

Software solution.

2.4 Installation (including the operating system)

The solution must support Linux-based installation (container or virtual machine). For a virtual machine, the operating system must be a Linux-based distribution that supports RPM-based package management.

the Purchaser gives Linux-based Docker container solution 20p and Linux-based installation on a virtual machine gives 0p (for more details, please see Appendix 4).

2.5 Database requirements

If a database is used to store the solution configuration or the unsent MSD data, it must be open-source software (preferably PostgreSQL or MariaDB).

The database must be separated from the application (usable as a standalone database service), and its connection parameters must be configurable. The Provider's delivery must include the creation of the database structure and the initial population with default values, if necessary. To this end, the solution must either support automatic structure management (database migrations upon application launch), or the Provider must provide the necessary SQL-scripts for creating and configuring the structure.

2.6 MSD data transmission via interface and API

The solution's interface must forward the MSD data obtained from the eCall or NG eCall call upon its arrival to SMIT's call solution in a structured format (preferably in JSON or XML formatting). As the transmission method, the solution must support either a REST call towards the API of SMIT's call solution (POST/PUT) or the use of a message broker (preferably RabbitMQ).

Additionally, the delivered solution must provide its own API interface for a repeated MSD query during an active (incoming or callback/outgoing) eCall call from both in-band- and SIP-capable IVS device.

The Provider will provide detailed service descriptions (e.g., OpenAPI/Swagger) for all the interfaces (both for data transmission and for repeat query). The descriptions must enable SMIT to independently develop the capability to receive data and make queries, deploy these in the necessary environments, and configure the parameters required for the interface to function.

If the MSD data transmitted or returned via the API is not identical to the "original" eCall MSD standard (1:1), the Provider must also provide a detailed description of the returned data fields and their structure.

2.7 Availability and data integrity

The implementation of the solution's interfaces and APIs must take into account the heightened requirements for availability and mitigate the risk of data loss. If the transmission of MSD data from an eCall call to a REST interface or message queue fails, the system must ensure that the data is resent, if possible (retry logic).

2.8 Monitoring and status control

The solution must log its operations at a level that enables its continued operating, including error analysis and rapid response. It must be possible to forward logs to the central log server by the agent installed by SMIT.

The solution must support real-time monitoring (provide services for monitoring its functionality) in order to ensure the detection of its operating status by an external monitoring system.

2.9 Installation environment and high availability

The solution must support high availability (HA) architecture both in the production environment (Live) and the test and training environments.

Call distribution and failover: The forward layer of the system is a network element (SBC) that handles the routing of eCall/NG eCall calls and the load distribution among the servicing servers. The solution must be installable and ready for operation in Primary-Secondary mode. SBC routes the call traffic to the first (primary) server. If the primary server is unavailable (for example if the eCall/NG eCall server doesn't respond to SIP OPTION queries), SBC will automatically reroute the call traffic over to the second (secondary) server.

Environmental similarity: The architecture of the test and training environments must be identical to that of the production environment, to enable the installation, management, stress testing, and the verification of the failover mechanisms under the same conditions as in the Live-environment.

2.10 Data volumes and performance requirements

Production environment (LIVE):

Session count: The solution must be capable of handling at least 10 simultaneous eCall/NG eCall calls/sessions without any delays in data processing.

Capacity: The system must be able to process up to 670 eCall calls per day.

Note: The figures are projected with a 10-to-30-fold reserve compared to the statistics for 2024 (ca 800 calls per year). The calculation takes into account the steady increase of vehicles with eCall capabilities in the car fleet (due to the addition of new vehicles and the replacement of old ones), which increases the load on the system even if the average age or the total number of vehicles in the fleet remains the same.

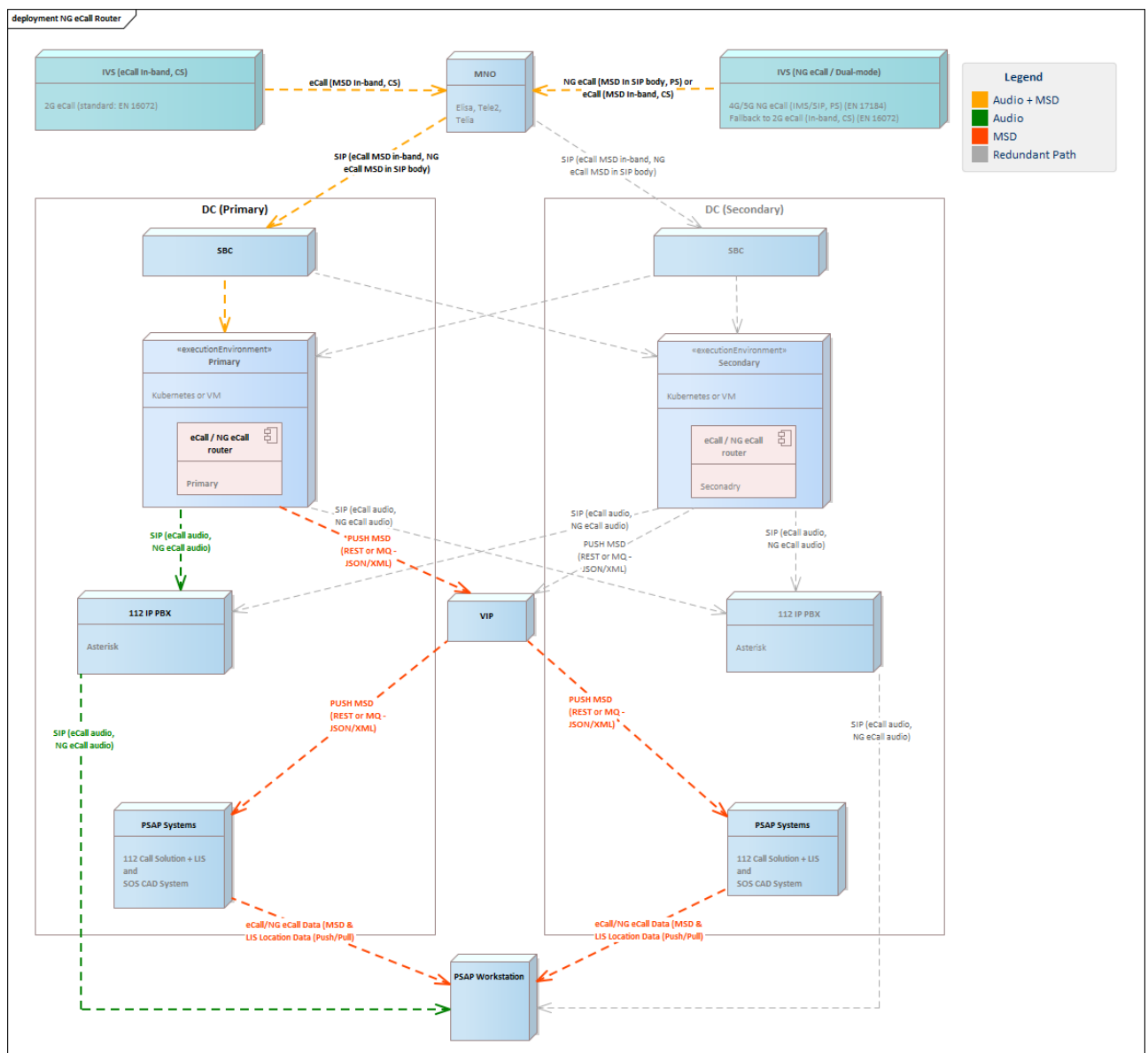
Test and training environment (TEST):

Session count: Test environment must be capable of handling up to 2 simultaneous eCall/NG eCall calls (depending on the number of test devices and vehicles used)

Resource use:

The solution must be optimal and should not place an unreasonable load on system resources (CPU, RAM, disk, etc.).

2.11 Installation and architecture



The diagram does not show:

- Using a database if necessary (see part "2.5 Database requirements");
- Using MQ instead of REST when sending MSD (MQ is not visualized as a separate component – it's part of the 112 Call Solution);
- Callback by the Emergency Response Center to the IVS device (see „2.2 Functionality“ section 1.b.i and 2.b.i);

- Querying a new MSD during an eCall call from an IVS device or from the Emergency Response Center to an IVS device - eCall / NG eCall router provides a service to 112 Call Solution for that (see „2.2 Functionality“ section 1.a.v, 1.b.iii, 2.a.v and 2.b.iii).

The installation and architecture are identical in production, test, and training environments.

3. Product delivery

3.1. Delivery content and components

The Provider must deliver a fully assembled and ready-to-install software package. The delivery includes:

- Software delivery: The delivery must contain all the necessary components according to the selected architecture (e.g., for Docker-container, the container file and installation files; for installation on a VM, the installation packages and all necessary dependencies).
- Database components: If the software installation requires the creation of a database, the delivery package must include the necessary scripts for creating the structure of an empty database and/or populating it with default data.
- Documentation: Software installation and management guide (in English or Estonian).
- Interface description (API documentation, etc.) with the level of detail required for development (in English or Estonian).

3.2. Delivery deadline

The procurement object must be delivered in full, and the delivery must be completed no later than 30 (thirty) calendar days after the conclusion of the procurement contract.

3.3. Installation and technical support

The software is installed in the test and production environment by the Purchaser (SMIT).

The Provider is required to provide free technical support for a period of 3 months following the delivery of the procurement object to resolve any issues arising during installation or integration that result from the product itself or from inaccuracies or omissions in the installation and maintenance manual.

If support provided via email or phone is insufficient for resolving the issue, the Provider must ensure operational real-time (online) video conference support at a time that is convenient for both parties and mutually agreed upon.

4. Terms of use for the product and requirements for the support/maintenance of the product

4.1 Terms of use for the product

Upon the delivery of the procurement object, the Provider shall grant the Purchaser (SMIT) and the end user (Emergency Response Center) a perpetual, unrestricted and royalty-free right (license) to install and use the product in the manner and to the extent specified in the technical specifications.

The ordering of product support and maintenance must be optional for the Purchaser starting from the third (3) year.

4.2 Support, maintenance and warranty

The Provider shall provide product support and maintenance services at minimum under the following conditions:

During the product support and maintenance period, all product updates must be made available to the Purchaser, including:

- Standards updates: Bringing the product into compliance with evolving NG eCall standards and technical requirements.
- Base software compatibility: Changes resulting from the updates to the base software required for the functioning of the product (e.g., operating system versions, database engines, container platforms).
- Security patches: Fixing critical security vulnerabilities and releasing security patches shall be determined on a case-by-case basis by agreement between the Purchaser and the Provider, but in no event later than within 90 days following the identification of the vulnerability, whether identified by the Provider themselves or by a publicly disclosed manufacturer, CERT, or other reputable source.

Issue resolution and response times:

Issues are reported on weekdays (M – F, 09:00–17:00 CET+1).

The Provider must begin responding no later than two (2) weekdays after receiving the report.

The timeframe for resolving the issue will be agreed upon based on the severity of the issue, but the Provider must do everything in their power to provide an initial solution or a temporary solution/workaround at the earliest opportunity.

Product support includes technical consultation via email or phone and, when necessary (if the issue cannot be resolved remotely), real-time ONLINE support via video conference.

The Provider guarantees that the product meets the requirements set out in the technical description (warranty). During the warranty period (1 year from the delivery of the procurement object), the Provider is obliged to eliminate, free of charge, any software defects in the product that prevent its intended use.