SONY

mSafety Technical Specification

mSafety is a business solution that makes it easy to provide a digital health service on a wrist-worn device. Use the solution's wearables and device management for a remote service in a range of business areas: health and wellness, clinical trials and occupational health.

Partners can tailor their solution entirely while maintaining full control and security of the health data they collect. Customizability includes deciding what data is collected, how often, what is shown on the wearable's display, connection to external sensors and more.
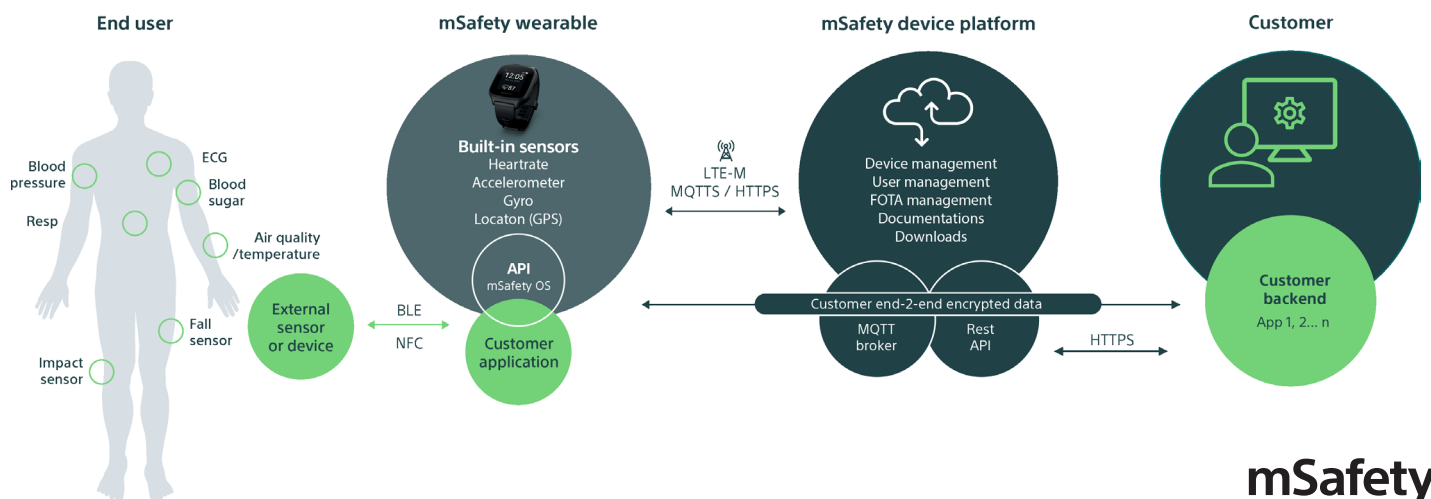
System architecture

The system architecture overview is illustrated in the image below. mSafety partners can customise their own unique health & safety applications to be embedded in the wearable, using the mSafety SDK.

The wearable communicates with the mSafety backend, using MQTT over TLS.

End-to End encryption of partner application data is done from collection point in the wearable application and decrypted in the partner's backend. This means that no customer's application data, e.g. health data, is visible in the mSafety backend.

Data from wearables is transmitted to partner-defined endpoints where the data is processed. The mSafety platform also includes dash-boards for subscription management, remote device configuration and "Over-The-Air" software updates.

End user

Blood pressure
ECG
Blood sugar
Resp
Air quality /temperature
Fall sensor
Impact sensor

External sensor or device

BLE
NFC

mSafety wearable

Built-in sensors
Heartrate
Accelerometer
Gyro
Locaton (GPS)

API
mSafety OS

Customer application

LTE-M
MQTTS / HTTPS

mSafety device platform

Device management
User management
FOTA management
Documentations
Downloads

Customer end-2-end encrypted data

MQTT broker
Rest API

HTTPS

Customer

Customer backend
App 1, 2... n

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Sony wearable dataset

The LTE-modem – ALT1250MOD – in the cellular wearable is made by Altair, a Sony company. This is an advanced LTE release 13 CAT-M1 chipset, featuring ultra-low power consumption. The modem incorporates an LTE base band processor, RFIC, PMU, memory, power amplifiers, filters and antenna switch, and a cellular-based location engine. The chipset features ultra-low power consumption in a variety of modes, including 3GPP PSM and eDRX. This provides a long battery life.

The other core component of the mSafety wearable is Sony's power-efficient multicore microcontroller CXD5602 that runs 6 ARM Cortex-M4F cores with a clock speed of up to 156MHz and has an integrated GPS. Thanks to the FD-SOI (Fully Depleted Silicon On Insulator) production process, the CXD5602 chip is very power efficient.

mSafety supports Bluetooth Low Energy for connection with external sensors. For notifications, both a vibrator and a buzzer are provided. The device itself has built-in sensors for physical activity, heart rate, body effort and sleep patterns. The device comes with three programmable buttons and has a monochrome touch display offering high visibility. mSafety customers create applications for the wearable using a high-level SDK. This SDK provides APIs which support, for example:

- Cellular and Bluetooth communication.
- User interface components such as buttons, lists, texts, dialogues and sound/vibration notifications.
- Access to internal sensors and buzzer/vibrator.
- Customize remote configurable parameters.
- Security functions, e.g. encryption of sensor data.

Partner-created unique keys ensure that only partner-signed applications can run on the device.

The wearable meets the IP68 standards on water resistance and is manufactured according to Sony's own strict requirements.

Health and medically graded applications
The device is tailored for health and medical applications, fulfilling requirements for medical hardware manufacturing according to ISO 13485 and QSR820. Medical certification of the customer application lies in the responsibility of the customer.

Wearable technical information

eUICC	LTE Cat-M connectivity, ready-to-use with global roaming profile (embedded Universal Integrated Circuit Card)
Size	53,2 x 45,0 x 12,75 mm
Weight	about 30g
Battery life	Depending on customers's individual use case, usage, data transmission, etc.
	Approx. 5 days battery life in a reference patient monitoring application (depending on network conditions): • LTE sending data (1 time / 15 mins) • eDRX 41secs • Activity monitor enabled • Display on (1 time / 15 mins, on for 15secs) • HR Monitor (1 time / 15 mins, 1 min measurement) • No GPS • Get data from BLE sensor (1 time / 5mins)
Water resistance	IP68
User Interface	1.4 inch 160x160 pixel Monochrome OLED with touch + 3 HW keys
Built-in sensors	Accelerometer, GPS, Gyro, Heart Rate (PPG)
Algorithms	Heart Rate Variability, VO2 max, Calories, Footsteps, Position, Fall detection, Sleep
Built-In vibrator	For notifications
Buzzer sound pressure	>79dB
Durability	Sony Global Quality standards for wearables in rough usage (i.a. drop, shock, vibration, thermal shock, extreme temperatures)
Celular direct Cloud connection	LTE Cat-M1, rel13 Europe (B3, B8, B20, B28), Japan (B1, B8, B26), US (B2, B4, B12, B13, B14, B17)
Connectivity	Bluetooth Low Energy, GPS, LTE
GNSS	GLONASS, GPS
Sensors connection	Medical and non medical partner network

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Device management

The mSafety device management is built on the AWS IoT Core platform - a framework for managing IoT devices. mSafety provides the fundamental structures needed for IoT devices to interact with a cloud backend in a secure and scalable way. The backend architecture has a multi-tenant design, which means that resources from different customers are separate. The cloud solution provides features that are described below.

Device security:

- Sony generates the device X.509 client certificate and private/public key pair.
- Certificates are provisioned in the factory.
- Server & client are mutually authenticated using TLS.

Device onboarding:

- mSafety customers register new devices through the mSafety Cloud API.
- When the device is powered up for the first time, the data subscription plan is activated and an onboarding process with the mSafety backend is executed.

Cloud APIs for mSafety customers:

- REST APIs for registering devices, start subscribing to data, etc.
- Customers access cloud APIs through Web ID Token (JWT RS256) or AWS Token.

Data transfer from device to customer backend

- Customers start subscribing to device data to their backend, using the mSafety cloud API.
- Customers provides an "API Endpoint" to which the mSafety backend sends device data.

Customer dashboards, supporting customers with:

- Device management, e.g status, usage, grouping.
- Over-The-Air software updates for individuals, groups or whole fleets.
- Remote configuration of wearables, e.g. connectivity patterns.
- Remote configuration of wearable application parameters, e.g. frequency of data upload, sensor sample time.

Cloud solution technical information

Core platform	Based on AWS IoT core, configured for high security
Platform architecture	Highly scalable cost efficient multi-tenant platform, i.e. data is isolated per customer
Device security	X.509 Client certificates pre-provisioned into device Server & Client mutually authenticated using TLS
Interface to customer	Cloud REST APIs and dashboards Access authorization to cloud APIs through Web ID Token (JWT RS256)
Device management	Client certificate/private key provisioning Device onboarding OTA software update and configuration
Device analytics	Insights on device data usage, software versions and device health
Device Communication Protocols	MQTT over TLS
Customer access to device data	Customer provides "API Endpoint"

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mSafety is a business solution that makes it easy to provide a digital health service on a wrist-worn device. Use the solution's wearables and management interface for a remote service in a range of business areas: health and wellness, clinical trials and occupational health. Customers can get started with a ready-made mSafety service and customise it as their business grows. With mSafety, enjoy user-friendly experiences, efficient management, secure data and true health innovation.

https://sonynetworkcom.com/msafety/

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