
Health informatics — Provisions for health applications on mobile/smart devices

*Informatique de santé — Provisions pour les applications de santé sur
les dispositifs smart/mobiles*

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Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular the different approval criteria needed for the different types of ISO documents should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see www.iso.org/directives).

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights. Details of any patent rights identified during the development of the document will be in the Introduction and/or on the ISO list of patent declarations received (see www.iso.org/patents).

Any trade name used in this document is information given for the convenience of users and does not constitute an endorsement.

For an explanation on the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the WTO principles in the Technical Barriers to Trade (TBT) see the following URL: Foreword - Supplementary information

The committee responsible for this document is ISO/TC 215, *Health informatics*.

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Introduction

Development and implementation of smart devices are rapidly progressing around world. An appropriate deployment of smart health applications and services on smart device platforms will enhance various aspects of healthcare delivery. Smart devices will also enable health organizations to provide essential care and health information anytime, anywhere through information and telecommunications technologies. This includes a broad spectrum of capabilities including health sensors, devices, manager, server, health information systems, and call centre services of patient information.

Recent development of smart devices such as smart phone, TV, and electronic book where the patients' services are stored and distributed securely whenever necessary (sharing EHR information at point of care) requires a robust architecture to be able to manage the mobile data effectively.

This Technical Report describes the status and requirements of health applications and services on smart devices platforms and suggests the reference architecture for these. The report is not intended to be prescriptive either from a methodological or technological perspective.

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Health informatics — Provisions for health applications on mobile/smart devices

1 Scope

This Technical Report is applicable to the developments of smart health applications available anywhere, anytime and supporting new health businesses based on the smart devices. This Technical Report is to investigate the areas of ongoing developments and analyses of emerging interoperability standards for smart mobile devices.

2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

There are no normative references.

3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

3.1

accelerometer

device that measures proper acceleration

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3.2

access

provision of an opportunity to approach, inspect, review, make use of data, or information

3.3

android

open source operating system for mobile devices developed by a group of organizations led by Google

3.4

application

software program or set of related programs that provide some useful healthcare capability or functionality

3.5

Apple iOS

previously iPhone OS

mobile operating system developed by Apple Inc. and distributed exclusively for Apple hardware

Note 1 to entry: It is the *operating system* (3.12) that powers iPhone, iPad, iPod Touch, and Apple TV.

3.6

BlackBerry

line of wireless handheld devices and *services* (3.20) designed and marketed by BlackBerry Limited, formerly known as Research In Motion Limited

3.7

bluetooth

standard for sending information wirelessly over short distances

3.8

healthcare professional

person entrusted with the direct or indirect provision of defined healthcare services to a subject of care or population of subjects of care

3.9

electronic health record

health record with data structured and represented in a manner suited to computer calculation and presentation

3.10

medical device

instrument, apparatus, implant, in vitro reagent, or similar or related article that is used to diagnose, prevent, or treat disease or other conditions and does not achieve its purposes through chemical action within or on the body

3.11

metadata

“data about data”

Note 1 to entry: The term is ambiguous, as it is used for two fundamentally different concepts.

3.12

operating system

set of programs that provide basic operating functions for hardware devices

EXAMPLE Starting up the device and running other software applications.

3.13

out-of-the-box functions

used to describe the functions of a device that run when you first buy it and start it up without the need to purchase or install any additional software or hardware

3.14

patient

individual person that is a subject of care

3.15

personal health record

may have contributions from providers of healthcare and the person or their carer/s

Note 1 to entry: The legal rules for a health record still apply to this record.

3.16

picture archiving and communication system

PACS

application system that uses an image server to exchange X-rays, CT scans, and other medical images over a network

3.17

registry

collection of all the official records relating to something or the place where they are kept

3.18

repository

place where something is kept safely

3.19

security

combination of confidentiality, integrity, and availability

3.20 service

specific behaviour that a communication party in a specific role is responsible for exhibiting

3.21 smartphone

additional features usually include media player and the ability to run mobile apps

Note 1 to entry: There is no single fixed definition of a smartphone.

3.22 standard

technical specification which addresses a business requirement, has been implemented in viable commercial products, and, to the extent practical, complies with recognized standards organizations such as ISO

3.23 tablet computer

mobile computer based around a flat touchscreen operated by finger or stylus

3.24 Windows phone Windows mobile

proprietary smartphone operating system developed by Microsoft

3.25 data carrier

all-encompassing term covering the different encoding modalities for machine readable data applied to the product packaging or directly to the product

Note 1 to entry: The possibilities include barcodes both 1D and 2 dimensions and radio frequency identification tags. It is critical to standards based mobile applications that the data is represented in symbol using ISO based standards such as GS1 and industry adopted guidelines.

3.26 vital sign

clinical information relating to one or more *patients* (3.14) that is measured by or derived from apparatus connected to the patient, or otherwise gathered from the patient

3.27 healthcare provider

healthcare organization or *healthcare professional* (3.8) responsible for the provision of healthcare to a subject of care or to a population

4 Symbols and abbreviated terms

AAC	Augmentative and Alternative Communication: Communication methods such as use of signs, symbols, or software tools to help people who have problems with the use of speech or written language to express themselves and communicate
API	Application Programming Interface: An interface that allows one piece of software to interact with another allowing developers to add new functions on top of existing software
BECS	Blood Establishment Computer Software
CDA	Clinical Document Architecture
DOC	Document query

ebXML	Electronic Business Extensible Markup Language
ECG	Electrocardiogram
ECG/EKG	Electrocardiography is the recording of the electrical activity of the heart
EHR	Electronic Health Record
FDA	Food and Drug Administration
FHIR	Fast Healthcare Interoperability Resources
GS1	General Specifications and Standards
HL7	Health Level 7
HIE	Health Information Exchange
HTTP	Hypertext Transfer Protocol
IHE	Integrating the Healthcare Enterprise
ISO	International Organization for Standardization
JSON	JavaScript Object Notation
MHD ^[38]	Mobile Access to Health Documents
OASIS	Organization for the Advancement of Structured Information Standards
OS	Operating System
PACS	Picture Archiving and Communication System
PCD	Patient Care Device
PDQ	Patient Demographics Query
PHR	Personal Health Record
PIX ^[37]	Patient Identifier Cross Referencing
PMA	Premarket Approval
QPB	Query by Parameter/Segment Pattern Response
QRY	Query, original mode
RHEx	RESTful Health Exchange
RIM	Reference Information Model
RS	Registry Service
RSP	Segment Pattern Response
RTB	Tabular Response
SDK	Software Development Kit: A set of software tools that enable a developer to create applications for a specific operating system or other software environment

WAI	Web Accessibility Initiative: A project of workstream of the W3C (see below) that develops guidelines and techniques to make the web more accessible. Website: www.w3.org/WAI
W3C	World Wide Web Consortium: An open, collaborative international community of technology organizations, academic bodies, and others which creates and maintains the web's core technical standards. Website: www.w3.org
XDS	Cross Enterprise Document Sharing
XDW^[36]	Cross-Enterprise Document Workflow
XML	Extensible Markup Language

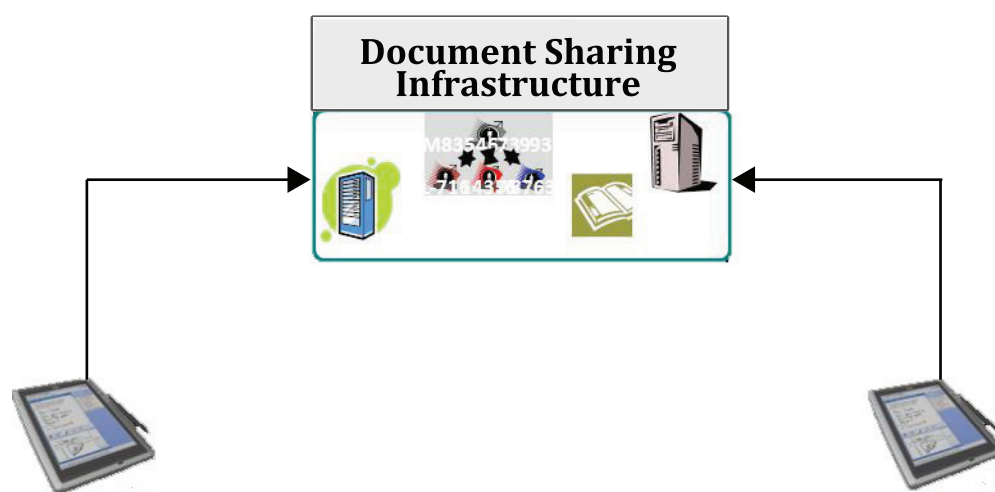
5 Mobile health applications based on Registry and Repository (Reg/Rep)

The mobile access to health documents (MHD) profile

- a) defines a simple HTTP interface to an XDS like environment, and
- b) defines transactions to
 - 1) submit a new document and metadata from the mobile device to a document receiver,
 - 2) get the metadata for an identified document,
 - 3) find document entries containing metadata based on query parameters, and
 - 4) retrieve a copy of a specific document.

The above four transactions leverage the document content and format agnostic metadata concepts from XDS, but simplify them for access by constrained environments such as mobile devices. The MHD profile does not replace XDS. It can be used to allow mobile devices constrained access to an XDS health information exchange.

[Figure 1](#) shows one possible way to implement the MHD with a document sharing environment (that may, but is not necessarily, XDS based).



NOTE From Reference [38], [Figure 1](#).

Figure 1 — Mobile access to a document sharing environment