

ITU-T

TELECOMMUNICATION
STANDARDIZATION SECTOR
OF ITU

J.1204

(01/2022)

SERIES J: CABLE NETWORKS AND TRANSMISSION
OF TELEVISION, SOUND PROGRAMME AND OTHER
MULTIMEDIA SIGNALS

Smart TV operating system

Smart television operating system – Security framework

Recommendation ITU-T J.1204

Recommendation ITU-T J.1204

Smart television operating system – Security framework

Summary

Recommendation ITU-T J.1204 defines the security framework of a smart (TV) operating system (TVOS) to enable integrated broadcast and broadband (IBB)-capable cable set-top box (STB) and TV to apply to broadcasting services and IP-based interactive services provided by cable television operators and third-party providers. By running a TVOS, the IBB-capable STB and TV will be able to provide subscribers with advanced and personalized services by downloading and installing advanced and personalized apps from cable operators' platforms and third-party platforms, which are interconnected with the related cable operators' platforms.

Recommendation ITU-T J.1204 intends to specify the security framework of a smart TV operating system over integrated broadcast and broadband cable networks, which exploits the popular hardware based trusted execution environment (TEE) technology and has multiple security defence capabilities.

History

Edition	Recommendation	Approval	Study Group	Unique ID*
1.0	ITU-T J.1204	2020-08-13	9	11.1002/1000/14357
2.0	ITU-T J.1204	2022-01-13	9	11.1002/1000/14874

Keywords

Security framework, smart TV operating system, TVOS.

* To access the Recommendation, type the URL <http://handle.itu.int/> in the address field of your web browser, followed by the Recommendation's unique ID. For example, <http://handle.itu.int/11.1002/1000/11830-en>.

FOREWORD

The International Telecommunication Union (ITU) is the United Nations specialized agency in the field of telecommunications, information and communication technologies (ICTs). The ITU Telecommunication Standardization Sector (ITU-T) is a permanent organ of ITU. ITU-T is responsible for studying technical, operating and tariff questions and issuing Recommendations on them with a view to standardizing telecommunications on a worldwide basis.

The World Telecommunication Standardization Assembly (WTSA), which meets every four years, establishes the topics for study by the ITU-T study groups which, in turn, produce Recommendations on these topics.

The approval of ITU-T Recommendations is covered by the procedure laid down in WTSA Resolution 1.

In some areas of information technology which fall within ITU-T's purview, the necessary standards are prepared on a collaborative basis with ISO and IEC.

NOTE

In this Recommendation, the expression "Administration" is used for conciseness to indicate both a telecommunication administration and a recognized operating agency.

Compliance with this Recommendation is voluntary. However, the Recommendation may contain certain mandatory provisions (to ensure, e.g., interoperability or applicability) and compliance with the Recommendation is achieved when all of these mandatory provisions are met. The words "shall" or some other obligatory language such as "must" and the negative equivalents are used to express requirements. The use of such words does not suggest that compliance with the Recommendation is required of any party.

INTELLECTUAL PROPERTY RIGHTS

ITU draws attention to the possibility that the practice or implementation of this Recommendation may involve the use of a claimed Intellectual Property Right. ITU takes no position concerning the evidence, validity or applicability of claimed Intellectual Property Rights, whether asserted by ITU members or others outside of the Recommendation development process.

As of the date of approval of this Recommendation, ITU had not received notice of intellectual property, protected by patents/software copyrights, which may be required to implement this Recommendation. However, implementers are cautioned that this may not represent the latest information and are therefore strongly urged to consult the appropriate ITU-T databases available via the ITU-T website at <http://www.itu.int/ITU-T/ipr/>.

© ITU 2022

All rights reserved. No part of this publication may be reproduced, by any means whatsoever, without the prior written permission of ITU.

Table of Contents

		Page
1	Scope	1
2	References.....	1
3	Definitions	1
	3.1 Terms defined elsewhere	1
	3.2 Terms defined in this Recommendation.....	2
4	Abbreviations and acronyms	2
5	Conventions	3
6	Overview	3
7	Security architecture	4
	7.1 REE security	6
	7.2 TEE security	6
	7.3 Hardware security.....	6
8	Basic security capabilities	6
	8.1 Hardware security.....	6
	8.2 Software security	7
	8.3 Network security	8
	8.4 Data security	9
	8.5 Application security.....	9
9	Security mechanism.....	10
	9.1 Digital certificate security trust mechanism	10
	9.2 Security trust chain check mechanism	10
	9.3 Security storage mechanism	10
	9.4 REE/TEE communication	10
	9.5 Sandbox isolation security.....	11
10	Security functions	12
	10.1 Content security.....	12
	10.2 Service security	12
	10.3 Secure upgrade	12
	10.4 Miscellaneous security functions	12
	Bibliography.....	14

Introduction

This Recommendation is the fourth in a series on a smart television operating system (TVOS). The Recommendations for this smart TVOS cover functional requirements, architecture, and security and application programming interfaces (APIs):

Smart television operating system – Functional requirements [b-ITU-T J.1201]

Smart television operating system – Architecture [b-ITU-T J.1202]

Smart television operating system – Specification [b-ITU-T J.1203]

Smart television operating system – Security framework (ITU-T J.1204)

Smart television operating system – Hardware abstract layer application programming interface [b-ITU-T J.1205]

Recommendation ITU-T J.1204

Smart television operating system – Security framework

1 Scope

This Recommendation intends to specify the security framework of a smart TV operating system over integrated broadcast and broadband cable networks, which exploits the popular hardware based trusted execution environment (TEE) technology and has multiple security defence capabilities.

As described in the smart TV operating system (TVOS) requirement [ITU-T J.1201], the TVOS can support both traditional TV services and IP-based TV services such as over the top (OTT) services. As such, the security of the TVOS is very important.

2 References

The following ITU-T Recommendations and other references contain provisions which, through reference in this text, constitute provisions of this Recommendation. At the time of publication, the editions indicated were valid. All Recommendations and other references are subject to revision; users of this Recommendation are therefore encouraged to investigate the possibility of applying the most recent edition of the Recommendations and other references listed below. A list of the currently valid ITU-T Recommendations is regularly published. The reference to a document within this Recommendation does not give it, as a stand-alone document, the status of a Recommendation.

- [ITU-T J.205] Recommendation ITU-T J.205 (2012), *Requirements for an application control framework using integrated broadcast and broadband digital television*.
- [ITU-T J.1201] Recommendation ITU-T J.1201 (2022), *Smart television operating system – Functional requirements*.
- [ITU-T J.1202] Recommendation ITU-T J.1202 (2022), *Smart television operating system – Architecture*.
- [ITU-T X.509] Recommendation ITU-T X.509 (2019) | ISO/IEC 9594-8 (2020), *Information technology – Open Systems Interconnection – The Directory: Public-key and attribute certificate frameworks*.

3 Definitions

3.1 Terms defined elsewhere

This Recommendation uses the following terms defined elsewhere:

3.1.1 integrated broadcast and broadband (IBB) DTV service [ITU-T J.205]: A service that simultaneously provides an integrated experience of broadcasting and interactivity relating to media content, data and applications from multiple sources, where the interactivity is sometimes associated with broadcasting programmes.

3.1.2 rich execution environment (REE) [ITU-T J.1201]: An extensible and versatile operating environment that brings flexibility and capability.

3.1.3 secure operating system [ITU-T J.1202]: An operating system running in a trusted execution environment (TEE) which is used to trigger secure execution of applications within the TEE.

3.1.4 smart TV operating system (TVOS) [ITU-T J.1201]: A system software running on an integrated broadcast and broadband-capable (IBB-capable) cable set top box (STB) and television