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**Information technology — Biometrics —  
BioAPI Interworking Protocol**

*Technologies de l'information — Biométrie — Protocole  
d'interfonctionnement BioAPI*

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## Foreword

ISO (the International Organization for Standardization) and IEC (the International Electrotechnical Commission) form the specialized system for worldwide standardization. National bodies that are members of ISO or IEC participate in the development of International Standards through technical committees established by the respective organization to deal with particular fields of technical activity. ISO and IEC technical committees collaborate in fields of mutual interest. Other international organizations, governmental and non-governmental, in liaison with ISO and IEC, also take part in the work. In the field of information technology, ISO and IEC have established a joint technical committee, ISO/IEC JTC 1.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 2.

The main task of the joint technical committee is to prepare International Standards. Draft International Standards adopted by the joint technical committee are circulated to national bodies for voting. Publication as an International Standard requires approval by at least 75 % of the national bodies casting a vote.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO and IEC shall not be held responsible for identifying any or all such patent rights.

ISO/IEC 24708 was prepared by Joint Technical Committee ISO/IEC JTC 1, *Information technology*, Subcommittee SC 37, *Biometrics*, in collaboration with ITU-T. The identical text is published as ITU-T Rec. X.1083.



## Introduction

This Recommendation | International Standard, the BioAPI interworking protocol (BIP), specifies the syntax, semantics, and encodings of a set of messages ("BIP messages") that enable a BioAPI-conforming application to request biometric operations in BioAPI-conforming biometric service providers (BSPs) across node or process boundaries, and to be notified of events originating in those remote BSPs. It also specifies extensions to the architecture and behaviour of the BioAPI framework (specified in ISO/IEC 19784-1) that support the creation, processing, sending, and reception of BIP messages.

A scenario where this Recommendation | International Standard would be applicable is where a national government decides to establish a system of biometric enrolment and authentication that will involve a central database of all enrolled persons in the country, with access to that database from biometric devices in health-care, social services, immigration, and security services. This is one of several applications where the BIP would be of use.

The BIP protocol is designed so that a conforming implementation does not have to support the whole functionality of a BioAPI framework. Several conformance classes are defined in this Recommendation | International Standard to accommodate various degrees of support of such functionality. This makes it possible to create lightweight implementations of this Recommendation | International Standard in which support of BioAPI-conforming applications or BioAPI conforming BSPs is either not possible or not required.

This Recommendation | International Standard uses the ASN.1 notation (see ITU-T Rec. X.680 series | ISO/IEC 8824-1 multi-part standard) to specify the protocol messages.

Clauses 7 to 11 contain informative overview material. Clauses 12 onwards (and some annexes) provide the normative specification.

Clause 7 describes the architecture of BIP.

Clause 8 describes the mechanism of remote GUI event notifications.

Clause 9 presents some examples of possible system configurations using BIP.

Clause 10 describes the format of the biometric data transferred by BIP.

Clause 11 describes the identification of BIP endpoints, applications, and BSPs.

Clause 12 provides an overview of BIP message exchanges.

Clause 13 contains general provisions which are invoked by other clauses.

Clause 14 specifies the general syntax of a BIP message.

Clause 15 specifies the mapping between BioAPI types and the corresponding ASN.1 types that occur as components of BIP messages.

Clause 16 specifies the syntax of some individual BIP messages and the actions to be performed when receiving a BioAPI function call or a BIP message related to a BioAPI function call.

Clause 17 specifies the syntax of some individual BIP messages, and the actions to be performed when receiving a BioAPI callback or a BIP message related to a BioAPI callback.

Clause 18 specifies a number of conceptual tables to be used by an implementation.

Clauses 19 to 33 contain specific provisions which are invoked by other clauses.

Annex A is normative and specifies the TCP/IP binding of BIP.

Annex B is normative and specifies additional provisions for the TCP/IP binding of BIP.

Annex C is normative and specifies the SOAP/HTTP binding of BIP.

Annex D is informative and clarifies the minimal requirements for simple systems.

Annex E is informative and provides examples of scenarios in which the BIP might be employed.

Annex F is normative and contains the complete ASN.1 specification of BIP.

**INTERNATIONAL STANDARD  
ITU-T RECOMMENDATION**

**Information technology – Biometrics – BioAPI interworking protocol**

**1 Scope**

**1.1** This Recommendation | International Standard specifies the syntax, semantics, and encodings of a set of messages ("BIP messages") that enable a BioAPI-conforming application to request biometric operations in BioAPI-conforming biometric service providers (BSPs) across node or process boundaries, and to be notified of events originating in those remote BSPs.

NOTE – Both the local and the remote node or process can contain BSPs that provide storage and retrieval of biometric information records, processing or comparison of such records, or capture of biometric samples from one or more biometric sensors. It is possible for an individual node or process to contain both (one or more) applications that access remote BSPs, and (one or more) BSPs that are accessed by remote applications.

**1.2** This Recommendation | International Standard also specifies extensions to the architecture and behaviour of the BioAPI framework that support the creation, processing, sending, and reception of BIP messages. A BioAPI framework conforming to this Recommendation | International Standard (a "BIP-enabled framework") creates, processes, sends, and receives BIP messages in close relationship with BioAPI function calls and callbacks. Outgoing BIP messages can be generated and sent by the framework as part of the handling of an incoming call or callback. Incoming BIP messages can cause actions to be performed by the framework as though a call or callback has been received.

**1.3** This Recommendation | International Standard explicitly allows for BIP messages to be created, processed, sent, and received by a software entity (a "generic BIP entity") that is not necessarily a BIP-enabled framework.

NOTE – This makes it possible to create lightweight implementations of this Recommendation | International Standard in which support for BioAPI-conforming applications or BioAPI-conforming BSPs is either not possible or not required. There is no externally observable difference between the BIP messages created and sent by a generic BIP entity and those created and sent by a BIP-enabled framework. However, while a BIP-enabled framework is required to fully and properly implement the relationship specified herein between BIP messages and BioAPI function calls or callbacks, a generic BIP entity has no such obligation (see clause 6).

**1.4** This Recommendation | International Standard specifies the use of any of several commonly available transport protocols for the transfer of BIP messages between a pair of software entities ("BIP endpoints").

**1.5** Standardization of biometric data blocks (carrying raw, intermediate, or processed biometric samples) is not in the scope of this Recommendation | International Standard.

NOTE – Standardization of such formats is performed by the various parts of ISO/IEC 19794.

**1.6** Standardization of biometric information records (each containing one or more biometric data blocks together with identifying and other meta-information) is not in the scope of this Recommendation | International Standard.

NOTE – Standardization of the elements of such formats is performed by ISO/IEC 19785-1, which also contains the specification of a number of standardized biometric information record formats.

**1.7** Comparison algorithms for biometric identification or verification are not in the scope of this Recommendation | International Standard.

**1.8** The definition of security mechanisms is not in the scope of this Recommendation | International Standard, but a number of bindings to secure transport protocols are specified in order to support secure exchanges between BIP endpoints.

**1.9** The classification of, determination of, or requirements on the performance of biometric systems is not in the scope of this Recommendation | International Standard.

**1.10** This Recommendation | International Standard specifies a Version 1 of the BioAPI interworking protocol (BIP), and assigns it the ASN.1 object identifier value {iso standard 24708 version (1)} (see ITU-T Rec. X.680 | ISO/IEC 8824-1 for the meaning of this notation).

**1.11** ISO/IEC 19784-1 specifies version 2.0 and 2.1 of BioAPI. This Recommendation | International Standard provides support for only version 2.1.

## 2 Normative references

The following Recommendations and International Standards contain provisions which, through reference in this text, constitute provisions of this Recommendation | International Standard. At the time of publication, the editions indicated were valid. All Recommendations and Standards are subject to revision, and parties to agreements based on this Recommendation | International Standard are encouraged to investigate the possibility of applying the most recent edition of the Recommendations and Standards listed below. Members of IEC and ISO maintain registers of currently valid International Standards. The Telecommunication Standardization Bureau of the ITU maintains a list of currently valid ITU-T Recommendations.

### 2.1 Identical Recommendations | International Standards

- ITU-T Recommendation X.667 (2004) | ISO/IEC 9834-8:2005, *Information technology – Open Systems Interconnection – Procedures for the operation of OSI Registration Authorities: Generation and registration of Universally Unique Identifiers (UUIDs) and their use as ASN.1 Object Identifier components.*
- ITU-T Recommendation X.680 (2002) | ISO/IEC 8824-1:2002, *Information technology – Abstract Syntax Notation One (ASN.1): Specification of basic notation.*
- ITU-T Recommendation X.681 (2002) | ISO/IEC 8824-2:2002, *Information technology – Abstract Syntax Notation One (ASN.1): Information object specification.*
- ITU-T Recommendation X.682 (2002) | ISO/IEC 8824-3:2002, *Information technology – Abstract Syntax Notation One (ASN.1): Constraint specification.*
- ITU-T Recommendation X.683 (2002) | ISO/IEC 8824-4:2002, *Information technology – Abstract Syntax Notation One (ASN.1): Parameterization of ASN.1 specifications.*
- ITU-T Recommendation X.691 (2002) | ISO/IEC 8825-2:2002, *Information technology – ASN.1 encoding rules: Specification of Packed Encoding Rules (PER).*
- ITU-T Recommendation X.693 (2001) | ISO/IEC 8825-4:2002, *Information technology – ASN.1 encoding rules: XML Encoding Rules (XER).*
- ITU-T Recommendation X.693 (2001)/Amd.1 (2003) | ISO/IEC 8825-4:2002/Amd.1:2004, *Information technology – ASN.1 encoding rules: XML Encoding Rules (XER) – Amendment 1: XER encoding instructions and EXTENDED-XER.*

### 2.2 Paired Recommendations | International Standards equivalent in technical content

None.

### 2.3 Additional references

- ISO/IEC TR 8802-1:2001, *Information technology – Telecommunications and information exchange between systems – Local and metropolitan area networks – Specific requirements – Part 1 : Overview of Local Area Network Standards.*
- ISO/IEC 19784-1:2006, *Information technology – Biometric application programming interface – Part 1: BioAPI specification.*
- ISO/IEC 19785-1:2006, *Information technology – Common Biometric Exchange Formats Framework – Part 1: Data element specification.*
- ISO/IEC 19785-3:2007, *Information technology – Common Biometric Exchange Formats Framework – Part 3: Patron format specifications.*
- ISO/IEC 19794 (all parts), *Information technology – Biometric data interchange formats.*
- IETF RFC 768 (1980), *User Datagram Protocol.*
- IETF RFC 791 (1981), *Internet Protocol.*
- IETF RFC 793 (1981), *Transmission Control Protocol.*
- IETF RFC 826 (1982), *Ethernet Address Resolution Protocol.*
- IETF RFC 1945 (1996), *Hypertext Transfer Protocol – HTTP/1.0.*
- IETF RFC 2131 (1997), *Dynamic Host Configuration Protocol.*
- IETF RFC 2136 (1997), *Dynamic Updates in the Domain Name System (DNS UPDATE).*
- IETF RFC 2462 (1998), *IPv6 Stateless Address Autoconfiguration.*

- IETF RFC 2616 (1999), *Hypertext Transfer Protocol – HTTP/1.1*.
- IETF RFC 2818 (2000), *HTTP Over TLS*.
- IETF RFC 3315 (2003), *Dynamic Host Configuration Protocol for IPv6 (DHCPv6)*.
- IETF RFC 3927 (2005), *Dynamic Configuration of IPv4 Link-Local Addresses*.
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