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# IEEE Standard for Biometric Open Protocol

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USA

**IEEE Std 2410™-2017**
(Revision of
IEEE 2410-2015)

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# IEEE Standard for Biometric Open Protocol

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Approved 28 September 2017

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**Abstract:** Identity assertion, role gathering, multilevel access control, assurance, and auditing are provided by the Biometric Open Protocol Standard (BOPS). The BOPS implementation includes software running on a client device, a trusted BOPS server, and an intrusion detection system. The BOPS implementation allows pluggable components to replace existing components' functionality, accepting integration into current operating environments in a short period of time. The BOPS implementation provides continuous protection to the resources and assurance of the placement and viability of adjudication and other key features. Accountability is the mechanism that proves a service-level guarantee of security. The BOPS implementation allows the systems to meet security needs by using the application programming interface. The BOPS implementation need not know whether the underlying system is a relational database management system or a search engine. The BOPS implementation functionality offers a "point-and-cut" mechanism to add the appropriate security to the production systems as well as to the systems in development. The architecture is language neutral, allowing Representational State Transfer (REST), JavaScript Object Notation (JSON), and Secure Sockets Layer (SSL) or Transport Layer Security (TLS) to provide the communication interface. The architecture is built on the servlet specification, open SSLs, Java, JSON, REST, and an open persistent store. All tools adhere to open standards, allowing maximum interoperability.

**Keywords:** admin console, application, BOPS admin, BOPS cluster, BOPS IDS, BOPS server, client device IDS, IDS cluster, IEEE 2410™, Jena Rules, liveness, original site admin, site admin, trusted adjudicated data, user, user device

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The Institute of Electrical and Electronics Engineers, Inc.
3 Park Avenue, New York, NY 10016-5997, USA



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**Clayton Stewart,** *Vice Chair*

Elizabeth Belousov
Bradley Boyer
Stephen Suffian
Mark Thompson

The following members of the individual balloting committee voted on this standard. Balloters may have voted for approval, disapproval, or abstention.

Charles Barest
Sourav Dutta
Dan Friedman
Fernando Garcia-Quismondo
Randall Groves
Marco Hernandez
Werner Hoelzl
Noriyuki Ikeuchi
Piotr Karocki
Stuart Kerry
Maximilian Riegel
Clayton Stewart
Scott Streit
Walter Struppler
Stephen Suffian
Mehmet Ulema
John Vergis
Oren Yuen

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Damir Novosel
Ronald C. Petersen
Annette D. Reilly
Robby Robson
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Adrian Stephens
Mehmet Ulema
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Howard Wolfman
Yu Yuan

*Member Emeritus

## Introduction

This introduction is not part of IEEE Std 2410™-2017, IEEE Standard for Biometric Open Protocol.

Biometrics encryption, enhanced intrusion detection system (IDS) analytics, and advanced identification process distinguish the architecture design of IEEE Std 2410™-2017 from its predecessor IEEE Std 2410™-2015. The reinforced architecture of the Biometric Open Protocol Standard (BOPS) is well suited for implementation into enterprise systems for secure authentication via biometric modalities.

The biometric enrollment information, i.e., representation of a fingerprint, voice, facial features, is cryptographically protected into two parts and stored, respectively, on a client device and a remote BOPS server. Visual cryptography (VC) and the Euclidian distance matching algorithms make it nearly impossible to recover or reverse engineer one part of biometrics if another part is compromised.

With the increasing need to secure user's access to their footprints of personally identifiable information (PII) in the Internet (financial and health records) and enterprise assets, the BOPS server is designed to control communication with its clients via two-way secure socket layer/transport layer security (SSL/TLS) and to monitor authentication logs and patterns with IDS analytics. Figure 1 describes the authentication cycle for the BOPS framework.

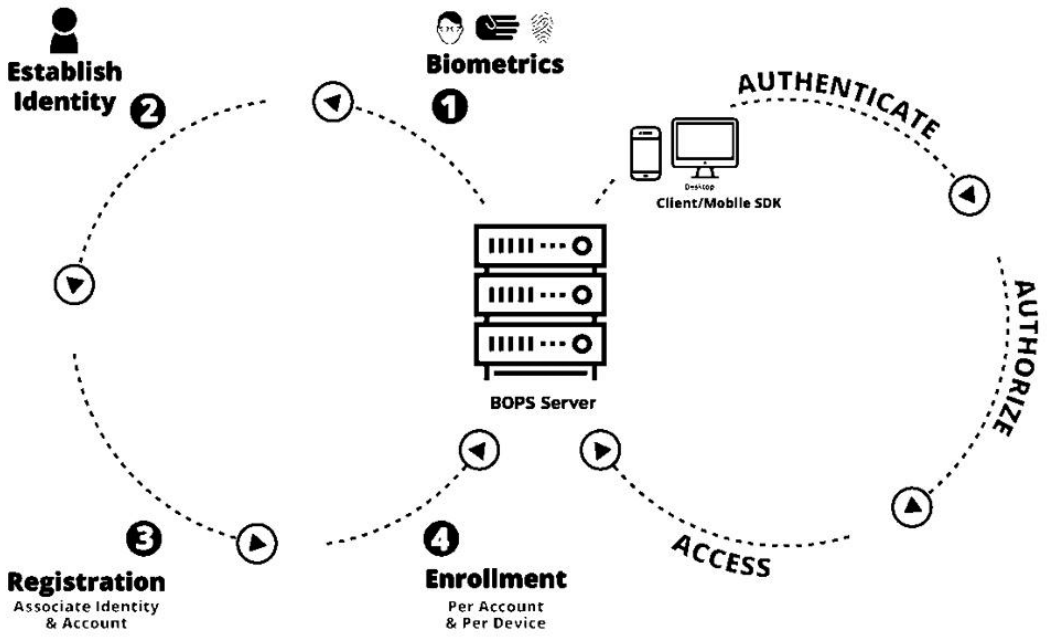


**Figure 1—BOPS authentication cycle**

Before users are being granted access via the BOPS platform, they shall authenticate their identity with an enterprise system that controls access to the resources and assets. If authentication is successful, the user is authorized to access the resource or asset (i.e., they are "granted access"). Otherwise, they are denied access. Identity is often established at some prior phase via registration of a username that identifies the user with an account in the system.

Biometrics have a long-held hope of replacing passwords by establishing a non-repudiated identity and providing authentication with convenience. Biometrics include a wide range of information taken from a person, e.g., fingerprints, face, voice, and iris pattern, and his/her behavioral properties, e.g., gait, date, time, and location. Recent increases in the processing power and sensor technologies allow digital signal processing (DSP) algorithms to run in the time needed for a real-time authentication (1–5 s similar to username and password login processing). Unlike passwords, biometrics cannot be script-injected; however, biometric data is considered highly sensitive due to its personal nature and unique association with users. Secure storage, transport, and processing of biometric data is paramount in the design and implementation of the BOPS system.

Where IEEE Std 2410-2015 signified a new approach in Identity and Access Management that enabled a password replacement and multi-factor authentication, the IEEE Std 2410-2017 brings a new level of consumer privacy assurance by keeping biometric data encrypted at rest and transit.

## Contents

# IEEE Standard for Biometric Open Protocol

## 1. Overview

### 1.1 Scope

The Biometric Open Protocol Standard (BOPS) provides identity assertion, role gathering, multilevel access control, assurance, and auditing. The BOPS implementation includes software running on a client (e.g., web or mobile), a trusted BOPS server, and an intrusion detection system (IDS). The BOPS implementation allows pluggable components to replace existing components' functionality, accepting integration into the current operating environments in a short period of time. The BOPS implementation adheres to the principle of continuous protection in adjudicating access to resources. Accountability is the mechanism that proves a service-level guarantee of security. The BOPS implementation allows the systems to meet security needs by using the application-programming interface (API). The BOPS implementation need not know whether the underlying system is a relational database management system (RDBMS) or a search engine. The BOPS implementation functionality offers a "point-and-cut" mechanism to add the appropriate security to the production systems as well as to the systems in development.

BOPS includes authentication with splitting of the initial biometric vector (IBV), sometimes called the initial template, optionally into one or two pieces. Irrespective of the number of pieces, the IBV is encrypted in a keyless fashion and the subsequent biometric match optionally occurs on the client or on the server, as denoted by an administration parameter.

### 1.2 Purpose

This standard provides a means to gather biometric data using a multi-level security protocol for authentication, identification, and access control and assurance.

### 1.3 Intended audience

The intended audience of this document includes security evaluators, system underwriters, developers, and systems engineers. The BOPS is subject to changes and updates.

## 2. Normative references

The following referenced documents are indispensable for the application of this document (i.e., they must be understood and used, so each referenced document is cited in text and its relationship to this document is explained). For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments or corrigenda) applies.