CEN

WORKSHOP

AGREEMENT

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Extensions for Financial Services (XFS) interface specification Release 3.40 - Part 19: Biometrics Device Class Interface Proposal - Programmer's Reference

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European Foreword

This CEN Workshop Agreement has been developed in accordance with the CEN-CENELEC Guide 29 "CEN/CENELEC Workshop Agreements – The way to rapid consensus" and with the relevant provisions of CEN/CENELEC Internal Regulations – Part 2. It was approved by a Workshop of representatives of interested parties on 2019-10-08, the constitution of which was supported by CEN following several public calls for participation, the first of which was made on 1998-06-24. However, this CEN Workshop Agreement does not necessarily include all relevant stakeholders.

The final text of this CEN Workshop Agreement was provided to CEN for publication on 2019-12-12.

The following organizations and individuals developed and approved this CEN Workshop Agreement:

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The CWA is published as a multi-part document, consisting of:

Part 1: Application Programming Interface (API) - Service Provider Interface (SPI) - Programmer's Reference

Part 2: Service Classes Definition - Programmer's Reference

Part 3: Printer and Scanning Device Class Interface - Programmer's Reference

Part 4: Identification Card Device Class Interface - Programmer's Reference

Part 5: Cash Dispenser Device Class Interface - Programmer's Reference

Part 6: PIN Keypad Device Class Interface - Programmer's Reference

Part 7: Check Reader/Scanner Device Class Interface - Programmer's Reference

Part 8: Depository Device Class Interface - Programmer's Reference

Part 9: Text Terminal Unit Device Class Interface - Programmer's Reference

Part 10: Sensors and Indicators Unit Device Class Interface - Programmer's Reference

Part 11: Vendor Dependent Mode Device Class Interface - Programmer's Reference

Part 12: Camera Device Class Interface - Programmer's Reference

Part 13: Alarm Device Class Interface - Programmer's Reference

Part 14: Card Embossing Unit Device Class Interface - Programmer's Reference

Part 15: Cash-In Module Device Class Interface - Programmer's Reference

Part 16: Card Dispenser Device Class Interface - Programmer's Reference

Part 17: Barcode Reader Device Class Interface - Programmer's Reference

Part 18: Item Processing Module Device Class Interface - Programmer's Reference

Part 19: Biometrics Device Class Interface - Programmer's Reference

Parts 20 - 28: Reserved for future use.

Parts 29 through 47 constitute an optional addendum to this CWA. They define the integration between the SNMP standard and the set of status and statistical information exported by the Service Providers.

Part 29: XFS MIB Architecture and SNMP Extensions - Programmer's Reference

Part 30: XFS MIB Device Specific Definitions - Printer Device Class

Part 31: XFS MIB Device Specific Definitions - Identification Card Device Class

Part 32: XFS MIB Device Specific Definitions - Cash Dispenser Device Class

Part 33: XFS MIB Device Specific Definitions - PIN Keypad Device Class

Part 34: XFS MIB Device Specific Definitions - Check Reader/Scanner Device Class

Part 35: XFS MIB Device Specific Definitions - Depository Device Class

Part 36: XFS MIB Device Specific Definitions - Text Terminal Unit Device Class

Part 37: XFS MIB Device Specific Definitions - Sensors and Indicators Unit Device Class

Part 38: XFS MIB Device Specific Definitions - Camera Device Class

Part 39: XFS MIB Device Specific Definitions - Alarm Device Class

Part 40: XFS MIB Device Specific Definitions - Card Embossing Unit Class

Part 41: XFS MIB Device Specific Definitions - Cash-In Module Device Class

Part 42: Reserved for future use.

Part 43: XFS MIB Device Specific Definitions - Vendor Dependent Mode Device Class

Part 44: XFS MIB Application Management

Part 45: XFS MIB Device Specific Definitions - Card Dispenser Device Class

Part 46: XFS MIB Device Specific Definitions - Barcode Reader Device Class

Part 47: XFS MIB Device Specific Definitions - Item Processing Module Device Class

Part 48: XFS MIB Device Specific Definitions - Biometrics Device Class

Parts 49 - 60 are reserved for future use.

Part 61: Application Programming Interface (API) - Migration from Version 3.30 (CWA 16926) to Version 3.40 (this CWA) - Service Provider Interface (SPI) - Programmer's Reference

Part 62: Printer and Scanning Device Class Interface - Migration from Version 3.30 (CWA 16926) to Version 3.40 (this CWA) - Programmer's Reference

Part 63: Identification Card Device Class Interface - Migration from Version 3.30 (CWA 16926) to Version 3.40 (this CWA) - Programmer's Reference

Part 64: Cash Dispenser Device Class Interface - Migration from Version 3.30 (CWA 16926) to Version 3.40 (this CWA) - Programmer's Reference

Part 65: PIN Keypad Device Class Interface - Migration from Version 3.30 (CWA 16926) to Version 3.40 (this CWA) - Programmer's Reference

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Part 76: Barcode Reader Device Class Interface - Migration from Version 3.30 (CWA 16926) to Version 3.40 (this CWA) - Programmer's Reference

Part 77: Item Processing Module Device Class Interface - Migration from Version 3.30 (CWA 16926) to Version 3.40 (this CWA) - Programmer's Reference

In addition to these Programmer's Reference specifications, the reader of this CWA is also referred to a complementary document, called Release Notes. The Release Notes contain clarifications and explanations on the CWA specifications, which are not requiring functional changes. The current version of the Release Notes is available online from: https://www.cen.eu/work/Sectors/Digital_society/Pages/WSXFS.aspx.

The information in this document represents the Workshop's current views on the issues discussed as of the date of publication. It is provided for informational purposes only and is subject to change without notice. CEN makes no warranty, express or implied, with respect to this document.

1. Introduction

1.1 Background to Release 3.40

The CEN/XFS Workshop aims to promote a clear and unambiguous specification defining a multi-vendor software interface to financial peripheral devices. The XFS (eXtensions for Financial Services) specifications are developed within the CEN (European Committee for Standardization/Information Society Standardization System) Workshop environment. CEN Workshops aim to arrive at a European consensus on an issue that can be published as a CEN Workshop Agreement (CWA).

The CEN/XFS Workshop encourages the participation of both banks and vendors in the deliberations required to create an industry standard. The CEN/XFS Workshop achieves its goals by focused sub-groups working electronically and meeting quarterly.

Release 3.40 of the XFS specification is based on a C API and is delivered with the continued promise for the protection of technical investment for existing applications. This release of the specification extends the functionality and capabilities of the existing devices covered by the specification. Notable enhancements include:

- Common API level based 'Service Information' command to report Service Provider information, data and versioning.
- Common API level based events to report changes in status and invalid parameters.
- Support for Advanced Encryption Standard (AES) in PIN.
- VDM Entry Without Closing XFS Service Providers.
- Addition of a Biometrics device class.
- CDM/CIM Note Classification List handling.
- Support for Derived Unique Key Per Transaction (DUKPT) in PIN.
- Addition of Transaction Start/End commands.
- Addition of explicit CIM Prepare/Present commands

1.2 XFS Service-Specific Programming

The service classes are defined by their service-specific commands and the associated data structures, error codes, messages, etc. These commands are used to request functions that are specific to one or more classes of Service Providers, but not all of them, and therefore are not included in the common API for basic or administration functions.

When a service-specific command is common among two or more classes of Service Providers, the syntax of the command is as similar as possible across all services, since a major objective of XFS is to standardize function codes and structures for the broadest variety of services. For example, using the **WFSExecute** function, the commands to read data from various services are as similar as possible to each other in their syntax and data structures.

In general, the specific command set for a service class is defined as a superset of the specific capabilities likely to be provided by the developers of the services of that class; thus any particular device will normally support only a subset of the defined command set.

There are three cases in which a Service Provider may receive a service-specific command that it does not support:

The requested capability is defined for the class of Service Providers by the XFS specification, the particular vendor implementation of that service does not support it, and the unsupported capability is ***not*** considered to be fundamental to the service. In this case, the Service Provider returns a successful completion, but does no operation. An example would be a request from an application to turn on a control indicator on a passbook printer; the Service Provider recognizes the command, but since the passbook printer it is managing does not include that indicator, the Service Provider does no operation and returns a successful completion to the application.

The requested capability is defined for the class of Service Providers by the XFS specification, the particular vendor implementation of that service does not support it, and the unsupported capability ***is*** considered to be fundamental to the service. In this case, a WFS_ERR_UNSUPP_COMMAND error for Execute commands or

WFS_ERR_UNSUPP_CATEGORY error for Info commands is returned to the calling application. An example would be a request from an application to a cash dispenser to retract items where the dispenser hardware does not have that capability; the Service Provider recognizes the command but, since the cash dispenser it is managing is unable to fulfil the request, returns this error.

The requested capability is ***not*** defined for the class of Service Providers by the XFS specification. In this case, a WFS_ERR_INVALID_COMMAND error for Execute commands or WFS_ERR_INVALID_CATEGORY error for Info commands is returned to the calling application.

This design allows implementation of applications that can be used with a range of services that provide differing subsets of the functionalities that are defined for their service class. Applications may use the **WFSGetInfo** and **WFSAsyncGetInfo** commands to inquire about the capabilities of the service they are about to use, and modify their behavior accordingly, or they may use functions and then deal with error returns to make decisions as to how to use the service.

2. Biometric Devices

Biometrics refers to metrics related to human characteristics and biology. Biometrics authentication can be used as a form of identification and/or access control. This is an overview of biometrics, as well as an introduction to the terminology used in this document. It introduces to XFS the concept of scanning a person's biometric data in raw image form (raw biometric data), then processing it into a smaller more concise form that is easier to manage (biometric template data). The first scan of a user is called **ENROLLMENT** as the user is effectively being enrolled into a scheme by recording their biometric data. Thereafter subsequent scans of the user can be compared to the original data in order to verify who they say they are (**VERIFICATION**), or alternatively used to identify them as a specific individual (**IDENTIFICATION**). These concepts are explained below in more detail.

2.1 Enrollment

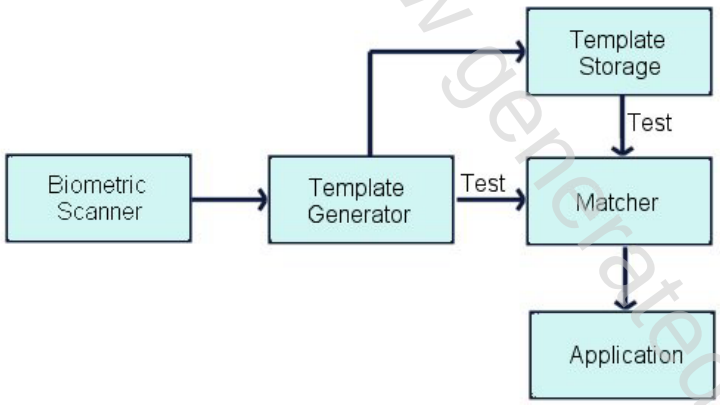
The first time an individual uses a biometric device it is called Enrollment. During enrollment, biometric data from an individual is captured and stored somewhere, for example on a smart card or in a server/host database. Normally the raw biometric data captured will be processed and converted to a smaller format that is used for subsequent comparison. This format is referred to in this document as a template. A template is a synthesis of the relevant characteristics extracted from the original raw data. Elements of the biometric data that are not used in the matching algorithm are discarded in the template to reduce the file size and to protect the identity of the enrollee.

2.2 Biometric Matching

During the matching phase, the obtained template is passed to a matcher which compares it to other existing templates and a probable match is calculated, either as a Boolean true or false or as a threshold indicating the likelihood of a match. With regard to matching, biometric systems commonly have two different basic modes of operation: Verification and Identification:

Verification: performs a one-to-one comparison of captured biometric data with a specific template in order to verify that an individual is the person they claim to be.

Identification: the system performs a one-to-many comparison of captured biometric data in order to establish a person's identity.



Note: The above diagram does not make any assumptions about where the actual matching takes place. The interface provided is versatile enough to be able to support three basic Biometric systems:

Match on server: The biometric template data is stored on a server or host. When scanning takes place biometric data is sent to the server, which does the actual identification or verification.

Match on card: The biometric enrollment data for an individual is stored on a smart card/personal device. The device scans a user then returns the biometric template information to the application. This data is then sent to the card, and an application on the smart card chip does the comparison, returning the result to the application.

Match on device: The biometric enrollment data for an individual is stored on a smart card or host. The enrollment data is read from the card or host and into the device, which then compares it to scanned information, returning the result to the application.

2.3 Biometric Device Types

There are many different varieties of biometric hardware, this XFS biometrics specification supports three main different types of device:

1. **Devices which only support scanning and returning biometric data**
   In this case the device is a simple biometric scanning device, User data is scanned using the WFS_CMD_BIO_READ command, but matching is performed externally, for example on a smart card or on a server. In this case the WFS_CMD_BIO_MATCH and WFS_CMD_BIO_SET_MATCH commands are not supported.
2. **Devices which support a separate scan and match functionality**
   These devices scan and perform a comparison as separate operations. Existing biometric data is first imported using the WFS_CMD_BIO_IMPORT command. When the WFS_CMD_BIO_READ command is then called the scanned user data is temporarily stored. The WFS_CMD_BIO_MATCH command is then called to perform the comparison and return the result.
3. **Devices which support a combined scan and match functionality**
   These devices scan and perform a comparison as a single operation. Existing biometric data is first imported using the WFS_CMD_BIO_IMPORT command. In this case the WFS_CMD_BIO_SET_MATCH command must be called first, either as a one-time call or before each WFS_CMD_BIO_READ command. The purpose of the WFS_CMD_BIO_SET_MATCH command is to set the criteria for matching. When the WFS_CMD_BIO_READ command is then called it scans the user's biometric data and also performs the comparison as a single operation. The WFS_CMD_BIO_MATCH command is then called to return the result of the comparison.

2.4 Biometric Data Security

It is recommended that biometric data should be treated with the same strict caution as any other identifying and sensitive information. A well designed biometric data handling architecture should always be designed to protect against internal tampering, external attacks and other malicious threats. There are various ways of implementing good security of which three are listed below:

- **Multi Modal Biometrics**
  A Uni-Modal biometric system relies on data taken from a single source of information for authentication, for example a single fingerprint reading device. In contrast, Multi-Modal biometric systems work on the premise that it is more secure to accept information from two or more biometric inputs. As an example a user could provide a fingerprint in addition to facial recognition, a positive match from two physical characteristics improves the chances of a positive identification and mitigates the possibility that biometric data has been cloned.
- **Data Encryption**
  Biometric data should be encrypted where possible. The BIO specification provides for this by allowing an encryption key to be specified whenever data is exchanged between an application and a BIO Service Provider. In addition, the key management interface methods of the PIN device class can be used for key management. This can be done by using the standard XFS compound device mechanism to implement a BIO Service provider as a compound device together with a PIN device class Service Provider. The device compounding mechanism is described in the XFS API specification. In this case the BIO Service Provider would implement the biometric methods necessary to read and return data, while the key loading, reporting etc. functions of the PIN Service Provider interface would be implemented in order to provide key management.

3. References

1. XFS Application Programming Interface (API)/Service Provider Interface (SPI), Programmer's Reference, Revision 3.40
2. ANSI INCITS 381-2004 Information Technology - Finger Image-Based Data Interchange Format
3. ANSI INCITS 378-2004 Information Technology - Finger Minutiae Format for Data Interchange
4. ISO/IEC 19794-4:2005 Information technology - Biometric data interchange formats - Part 4: Finger image data
5. ISO/IEC 19794-2:2005 Information technology - Biometric data interchange formats - Part 2: Finger minutiae data