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Sponsored by the Learning Technology Standards Committee
of the IEEE Computer Society

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This document is also available at:

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This note will be removed upon reaching the final draft of this IEEE document.]

Introduction

(This introduction is not part of IEEE P1484.2.23, Public and Private Information (PAPI) for Learners — Learner Security Information.)

** TO BE SUPPLIED **

At the time this Standard was completed, the working group had the following membership:

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1 Overview

Abstract

The Public and Private Information (PAPI) for Learners (PAPI Learner) Standard describes "portable" learner records. The PAPI Learner Standard is a data interchange specification, i.e., it is used for communication among cooperating systems ("cooperation" may be achieved by conformance to the PAPI Learner Standard and, possibly, other specifications). The data is exchanged: (1) via external specification, i.e., only PAPI Learner coding bindings are used while some other data communication method is mutually agreed upon by data exchange participants, (2) via control transfer mechanism to facilitate data interchange, e.g., PAPI Learner API bindings, or (3) via data and control transfer mechanisms, e.g., PAPI Learner protocol bindings.

An important feature of the PAPI Learner Standard is the logical division, separate security, and separate administration of several types of learner information. These types of information are also known as "profile information" and "learner profiles". The PAPI Learner Standard may be integrated with other systems, protocols, formats, and technologies. The PAPI Learner Standard is organized as the following Parts:

- IEEE 1484.2.1, "*Standard for Learning Technology — Public and Private Information (PAPI) for Learners (PAPI Learner) — Core Features*": The main data model and references to other standards.
- IEEE 1484.2.2, "*Guide for Learning Technology — Public and Private Information (PAPI) for Learners (PAPI Learner) — Rationale*": An explanation of important decisions during the development of this Standard.
- IEEE 1484.2.3, "*Guide for Learning Technology — Public and Private Information (PAPI) for Learners (PAPI Learner) — Learner Information Security Issues*": Information and recommendations on important security issues for implementations.
- IEEE 1484.2.4, "*Guide for Learning Technology — Public and Private Information (PAPI) for Learners (PAPI Learner) — Examples and Illustrations*": Information for implementers.
- IEEE 1484.2.5, "*Standard for Learning Technology — Public and Private Information (PAPI) for Learners (PAPI Learner) — Registration Authority Process*": How data elements, value space, coding schemes, code sets, etc. are registered.
- IEEE 1484.2.6, "*Standard for Learning Technology — Public and Private Information (PAPI) for Learners (PAPI Learner) — Data Element Registry*": The registry of data elements, value space, coding schemes, code sets, etc..
- IEEE 1484.2.21, "*Standard for Learning Technology — Public and Private Information (PAPI) for Learners (PAPI Learner) — Learner Contact Information*", e.g., name, postal address, telephone number, etc..
- IEEE 1484.2.22, "*Standard for Learning Technology — Public and Private Information (PAPI) for Learners (PAPI Learner) — Learner Relations Information*", e.g., classmates, teammates, mentors, etc..
- IEEE 1484.2.23, "*Standard for Learning Technology — Public and Private Information (PAPI) for Learners (PAPI Learner) — Learner Security Information*", e.g., public keys, private keys, credentials, etc..

- IEEE 1484.2.24, *"Standard for Learning Technology — Public and Private Information (PAPI) for Learners (PAPI Learner) — Learner Preference Information"*, e.g., as useful and unusable I/O devices, learning styles, physical limitations, etc..
- IEEE 1484.2.25, *"Standard for Learning Technology — Public and Private Information (PAPI) for Learners (PAPI Learner) — Learner Performance Information"*, e.g., grades, interim reports, log books, etc..
- IEEE 1484.2.26, *"Standard for Learning Technology — Public and Private Information (PAPI) for Learners (PAPI Learner) — Learner Portfolio Information"*, e.g., accomplishments and works, etc..

NOTE — The phrase "this Part" or "this Part of this Standard" self-refers to an individual part of the PAPI Learner Standard. The phrase "this Standard" or "the PAPI Learner Standard" refers to the whole collection of parts.

1.1 Scope

The PAPI Learner Standard is a multi-part standard that specifies the semantics and syntax of learner information. Learner information is information associated learners and used by learning technology systems. Learner information may be created, stored, retrieved, used, etc., by learning technology systems, individuals (e.g., teachers, learners, etc.), and other entities.

The PAPI Learner Standard defines and/or references elements for recording descriptive information about: knowledge acquisition, skills, abilities, personal contact information, learner relationships, security parameters, learner preferences and styles, learner performance, learner-created portfolios, and similar types of information. This Standard permits different views of the learner information (perspectives: learner, teacher, parent, school, employer, etc.) and substantially addresses issues of privacy and security.

This Part only specifies learner security information. This provisions in this Part are dependent upon the provisions of Part 1, Core Features, and may be dependent upon provisions of Part 6, Data Element Registry.

1.2 Purpose

The purpose of this Part is to provide small modules of learner information, such as security information. Users of the PAPI Learner Standard may choose the parts that are appropriate for their application.

2 Normative references

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

- IEEE P1484.2.1/D8, Standard for Learning Technology — Public and Private Information (PAPI) for Learners (PAPI Learner) — Core Features

- IEEE P1484.2.6/D8, Standard for Learning Technology — Public and Private Information (PAPI) for Learners (PAPI Learner) — Data Element Registry
- IEEE P1484.3/D3, Standard for Learning Technology — Glossary
- ISO/IEC 2382, Information Technology — Vocabulary (multiple parts)
- ISO/IEC 11404, Information Technology — Programming languages, their environments and system software interfaces — Language-independent datatypes
- ISO/IEC 15945, Specification of Trusted Third Party Services to Support the Application of Digital Signatures
- ISO/IEC 17799-1, Code of Practice for Information Security Management

3 Definitions

3.1 Definitions incorporated via normative reference

The following terms and their definitions have been incorporated via the normative references in the following order (lowest precedence to highest precedence):

- ISO/IEC 2382, Information Technology — Vocabulary (multiple parts)
- IEEE 1484.3, Glossary
- IEEE 1484.2.1, PAPI Learner — Core Features

3.2 Acronyms and abbreviations

- SPM: smallest permitted maximum

4 Conformance

IEEE 1484.2.1, Clause 4, Conformance, is incorporated by reference.

IEEE 1484.2.1, Annexes C-F, the conditionally normative annexes, are incorporated by reference.

5 Data model

IEEE 1484.2.1, Clause 5, Functionality, is incorporated by reference.

IEEE 1484.2.1, Clause 6, Conceptual Model, is incorporated by reference.

IEEE 1484.2.1, Clause 7, Semantics, is incorporated by reference.

This Clause defines datatypes that are used by the PAPI Learner contact information type. Embedded ISO/IEC 11404 comments apply to the ISO/IEC 11404 definition, for example:

- "all components optional" means that the obligation attribute is "optional" for all data elements within a record
- "all sizes are SPM" means that the size values are smallest permitted maximum values

NOTE 1 — Throughout this Clause, the abbreviation SPM is used, which means "smallest permissible maximum". The SPM value is intended to give implementers a lower limit on conforming im-

plementations. Applications should not assume that implementations support capabilities beyond the SPM value unless prior arrangements have been made.

NOTE 2 — Some non-ISO/IEC 11404 datatypes, such as `ssd_record`, etc., are defined in Part 1, Core Features.

5.1 `papi_learner_security_reference_type`

ISO/IEC 11404 definition

```
type papi_learner_security_reference_type =
    papi_learner_identifier_type,
```

Description

This datatype defines a reference (or pointer) to PAPI Learner security information.

Part 6, subclause 23.2, defines the minimum set of permissible values for this datatype. In addition, if an implementation claims conformance to Part 6, Data Element Registry, then Part 6, subclause 23.2 defines the permissible values for this data element.

5.2 `papi_learner_security_info_type`

ISO/IEC 11404 definition

```
type papi_learner_security_info_type =
    ssd_record
(
    // note: all components are optional; all sizes are SPM
    my_security_identifier_list : // database linking (key), SPM: 200
        papi_learner_identifier_type,
    security_hid_list : // HID linking (cross-repository), SPM: 200
        papi_learner_hid_type,
    credential_list : // Security credentials, SPM: 500
        papi_learner_security_credential_type,
    security_bucket : // other information, SPM: 300
        papi_learner_bucket_type,
),
```

Description

PAPI Learner security information is defined by this datatype.

The following components define this data element. All components are optional. All sizes or limits are smallest permitted maximum values.

- **`my_security_identifier_list`**: An internal database key for linking information.
- **`security_hid_list`**: An external human identifier for correlating information across data repositories.
- **`credential_list`**: A list of security credentials.
- **`security_bucket`**: A "bucket" for adding name-value pairs that provides limited extension capabilities to PAPI Learner security information. Part 6, subclause 23.3, defines the

minimum set of permissible values for this datatype. In addition, if an implementation claims conformance to Part 6, Data Element Registry, then Part 6, subclause 23.3 defines the permissible values for this data element.

5.3 papi_learner_security_credential_type

ISO/IEC 11404 definition

```
type papi_learner_security_credential_type =
record
(
  context_label :
    papi_learner_context_label_type,
  credential_kind :
    papi_learner_security_kind_type,
  credential_value :
    octetstring, // string length SPM: 8192
),
```

Description

An individual security credential. The meaning, namespace, scoping, and resolution of this feature are implementation-defined. The following components define this data element. All components are optional. All sizes or limits are smallest permitted maximum values.

- **context_label**: The context for use of this data element.
- **credential_kind**: The kind of credential.
- **credential_value**: The value of the credential. NOTE — The value domain for this datatype is dependent upon the value of **credential_kind**.

5.4 papi_learner_security_kind_type

ISO/IEC 11404 definition

```
type papi_learner_security_kind_type =
state // open list of permitted values
(
  // The minimum set of permitted values is defined in
  // Part 6, subclause 23.4 whose "approval status" is "approved".
),
```

Description

This datatype defines the kinds of security credentials.

Part 6, subclause 23.4, defines the minimum set of permissible values for this datatype. In addition, if an implementation claims conformance to Part 6, Data Element Registry, then Part 6, subclause 23.4 defines the permissible values for this data element.

NOTE 1 — Part 6, subclause 23.4 defines a set of permissible values, i.e., tags for the **state** datatype, and the meanings of these permissible values.

NOTE 2 — Even if conformance to Part 6 is not claimed, a portion of Part 6, subclause 23.4 still applies to Part 23 (this Part), i.e., the minimum set of permissible values.

6 Annex A: Examples (informative)

This Annex is informative and not normative.

6.1 ISO/IEC 11404 data set

The following is a sample ISO/IEC 11404 data set:

```
// ISO/IEC 11404 data set
(
  my_security_identifier_list =
  (
    (
      identifier_kind = "pointer",
      identifier_value = "0x12345678"
    ),
  ),
  security_hid_list =
  (
    (
      identifier_kind = "ISO_IEC_21484_13",
      identifier_value = "88990011"
    ),
  ),
  credential_list =
  (
    (
      context_label= "home",
      credential_kind = "password",
      credential_value = "swordfish"
    ),
    (
      context_label= "work",
      credential_kind = "biometric_type_1",
      credential_value = "120398123b10931203123"
    ),
  ),
),
```

6.2 XML coding

The following is a sample XML data instance:

```
<!-- XML data instance ("..." is replaced by outer tags) -->
<...>
  <my_security_identifier_list>
    <security_identifier>
      <identifier_kind>pointer</security_type>
      <identifier_value>0x12345678</security_value>
    </security_identifier>
  </my_security_identifier_list>
```

```

<my_security_hid_list>
  <learner_hid>
    <identifier_kind>ISO_IEC_21484_13</identifier_kind>
    <identifier_value>88990011</identifier_value>
  </learner_hid>
</my_security_hid_list>
<credential_list>
  <credential>
    <context_label>home</context_label>
    <credential_kind>password</credential_kind>
    <credential_value>swordfish</credential_value>
  </credential>
  <credential>
    <context_label>work</context_label>
    <credential_kind>biometric_type_1</credential_kind>
    <credential_value>120398123b10931203123</credential_value>
  </credential>
</credential_list>
</...>

```

6.3 DNVP coding

The following is a sample DNVP data instance:

```

#### DNVP data instance ("..." is replaced by outer context)
...my_security_identifier.__begin:
...my_security_identifier.identifier_kind: pointer
...my_security_identifier.identifier_value: 0x12345678
...my_security_identifier.__end:
...my_security_hid.__begin:
...my_security_hid.identifier_kind: ISO_IEC_21484_13
...my_security_hid.identifier_value: 88990011
...my_security_hid.__end:
...credential.__begin:
...credential.context_label: home
...credential.credential_kind: password
...credential.credential_value: swordfish
...credential.__end:
...credential.__begin:
...credential.context_label: work
...credential.credential_kind: biometric_type_1
...credential.credential_value: 120398123b10931203123
...credential.__end:

```

7 Annex B: Document development (informative)

This Annex is informative and not normative.

NOTE — This Annex will be removed prior to publishing of this Standard.

7.1 Revision history

- **Draft 8, 2001-11-25**, the current draft. This draft is a portion of the split of PAPI Learner drafts 6 and 7.

7.2 Release notes for this document

The following notes apply to this release of this document:

- This document is substantially complete.

7.3 Resolved issues

The following issues have been resolved:

- Split of PAPI Learner into separate documents.

7.4 Open issues

The following issues are outstanding:

- Common authentication methods should be registered in Part 6.

7.5 Comments on this document

All comments are appreciated. Please return all comments on this release of this document by **Friday, 2002-02-22 23:00 UTC**. The Technical Editor may be contacted at the following:

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