The Printer Working Group

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Imaging Device Security Model (IDS-Model)

Status: Interim

Abstract: This document defines a model and set of security requirements that are common to and shared between PWG standards and recommendations.

This document is a PWG Working Draft. For a definition of a "PWG Working Draft", see: ftp://ftp.pwg.org/pub/pwg/general/pwg-process30.pdf

This document is available electronically at:
ftp://ftp.pwg.org/pub/pwg/ids/wd/wd-ids-model10-20140804.pdf

Title: Imaging Device Security Model (IDS-Model)

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About the IEEE-ISTO PWG

The Printer Working Group (or PWG) is a Program of the IEEE Industry Standards and Technology Organization (ISTO) with member organizations including printer manufacturers, print server developers, operating system providers, network operating systems providers, network connectivity vendors, and print management application developers. The group is chartered to make printers and the applications and operating systems supporting them work together better. All references to the PWG in this document implicitly mean “The Printer Working Group, a Program of the IEEE ISTO.” In order to meet this objective, the PWG will document the results of their work as open standards that define print related protocols, interfaces, procedures and conventions. Printer manufacturers and vendors of printer related software will benefit from the interoperability provided by voluntary conformance to these standards.

In general, a PWG standard is a specification that is stable, well understood, and is technically competent, has multiple, independent and interoperable implementations with substantial operational experience, and enjoys significant public support.

For additional information regarding the Printer Working Group visit:

http://www.pwg.org

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89 About the Imaging Device Security (IDS) Work Group

90 Description of IDS.

91 For additional information regarding IDS visit:
92 http://www.pwg.org/ids/

93 Implementers of this specification are encouraged to join the IDS mailing list in order to
94 participate in any discussions of the specification. Suggested additions, changes, or
95 clarification to this specification, should be sent to the IDS Mailing list for consideration.
96

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1. Introduction

This standard defines a model and set of security requirements that are common to and shared between PWG standards and recommendations.

2. Terminology

2.1 Conformance Terminology

Capitalized terms, such as MUST, MUST NOT, RECOMMENDED, REQUIRED, SHOULD, SHOULD NOT, MAY, and OPTIONAL, have special meaning relating to conformance as defined in Key words for use in RFCs to Indicate Requirement Levels [RFC2119]. The term CONDITIONALLY REQUIRED is additionally defined for a conformance requirement that applies to a particular capability or feature.

2.2 Other Terminology

Security Domain: A bounded group of security objects and security subjects to which applies a single security policy executed by a single security administrator [ECMATR46]

Kerberized Printing: authenticated printing based on SPNEGO-based Kerberos and NTLM HTTP Authentication in Microsoft Windows [RFC4559], Transport Layer Security/1.2 [RFC5246], and Upgrading to TLS Within HTTP/1.1 [RFC2817].

Secure Transport: encryption of the HTTP connection using Transport Layer Security [RFC5246]. The security session may be negotiated at the initiation of the connection ("HTTPS") or by Upgrading to TLS Within HTTP/1.1 [RFC2817].

Network Visible Entity: A Network-visible Entity (NVE), also known as NVE socket, is the resource that is addressable through a network. Typically, an NVE is a socket client for a service available in a node. [JAVVIN].

Visible: A device or service is visible if one or more of its endpoints is addressable on a communication network and can be seen by other devices or services. In the PWG Security Model, visibility of a device or service does not imply that the device or service is accessible or useable, only that its existence is known or can be discovered.

Securely Visible: A device or service is securely visible if it is only visible to Devices, Services or Users that provided proper security credentials or use the proper secure network protocols. Securely Visible support for devices and services may be provided by secure network protocol such or may only be discoverable by a secure discovery protocol.

Endpoint: An endpoint is the directly addressable location of a device or resource in a communications network. In the PWG Security Model, an endpoint is usually the location

of a service providing a resource or function or the location of a physical device. Endpoints are typically specified as a protocol-specific network address, such as an Internet Protocol (IP) address or DNS name, or as a URL of a specific service instance. A device or service may have more than one endpoint.

Client: An application or software process that communicates with a service on behalf of a User.

Correlated Attributes: An ordered set of related attributes that describe an instance of firmware or software. The purpose of these Correlated Attributes is to allow ease-of-access and verification for each instance.

Imaging Operations: A set of service and job operations that can be performed on an Imaging device or service, such as Copy, Scan, Print, Fax, etc.

Delegated Resource: A resource whose owner has delegated a different actor to access or manage the resource in the owner's place.

System Account: A special type of account of a computer system used to run system or application processes that require less restricted access than an administrative or root account to system resources and processes.

Directory Service: A directory service is a collection of software and processes that store information about Users, Devices, Services or other resources.

2.3 Acronyms and Organizations

IANA: Internet Assigned Numbers Authority, http://www.iana.org/

IETF: Internet Engineering Task Force, http://www.ietf.org/

ISO: International Organization for Standardization, http://www.iso.org/

MFD: Multi-Function Device

PWG: Printer Working Group, http://www.pwg.org/

3. Requirements

3.1 Rationale for Imaging Device Security Model

Given the following existing and developing specifications:

- PWG 5110.3-2013, "PWG Common Log Format" [PWG5110.3]
- RFC 2911 "Internet Printing Protocol/1.1: Model and Semantics" [RFC2911]
- RFC 3995 "Internet Printing Protocol: Event Notifications and Subscriptions" [RFC3995]
- PWG 5100.12-2011 "IPP/2.0 Second Edition" [PWG5100.12]
- PWG 5100.14-2013 "IPP Everywhere" [PWG5100.14]
- IEEE 2600-2008 IEEE Standard for Information Technology: Hardcopy Device and System Security [IEEE2600]
- PWG Semantic Model [PWG5108.1]
- PWG Cloud Imaging Requirements and Model [PWG-CLOUD]

And given the need for a standard method of defining, describing, and enforcing security for Imaging Devices, the Imaging Device Security Model should:

1. Provide recommendations for Imaging Device Security policies based on accepted security best practices.
2. Define new Semantic Model elements to support identification of Users, Clients, Imaging Devices, Service, Subscriptions, Jobs, and Documents.
3. Define new Semantic Model elements to support authentication of Users, Clients andServices.
4. Define new Semantic Model elements to support Access Control for Users, Clients, Services, Subscriptions, Imaging Devices, Jobs, and Documents.
5. Define new Semantic Model elements to support Delegated Resource access.

3.2 Use Cases

3.2.1 Identify, Authenticate and Authorize a User

Mike wants to print a document from his mobile phone to a hotel printer. The hotel provides print service for hotel guest, and needs to ensure that only a guest uses a printer. Mike wants to make sure that he is using an available free hotel printer.

3.2.2 Enforce security requirements

John is using his laptop computer to print 100,000 copies of his company's product plan through an Internet printing service. The Internet printing service has a relationship with another printer service that can print the brochures in multiple locations that are close to John's company's branch offices. Since these product plans contain proprietary information, John and the print service need to ensure that all systems and companies involved in the process are properly identified and vetted.

3.2.3 Find a secure imaging device

Jerry is travelling in a foreign country and needs to securely print a document without fear that a chosen printer may create an illicit copy of the document. He configures his PC to find and use only printers that have been certified by a trusted certification authority to meet a specific level of security.

3.2.4 Ensure encrypted data In Transit

Jane is travelling to a branch office of her company and wants to use a public printing service to securely print a sensitive document on a company printer at her destination so the document is available when she arrives.

3.2.5 Control job access at the device

After Jane remotely sent her encrypted print job to a branch office printer, she wants to make sure that no one can pick up her jobs before her. She needs the print service or printer to hold the print job until she enters a release code to begin printing.

3.2.6 Control secure remote operation

Tom is working from home but needs some office documents scanned and sent to his home PC. While his administrative assistant can load the necessary documents into the scanner, the company needs to limit where and to whom the scanned documents can be sent. .

3.2.7 Audit Document Trail

A corporation suspects that confidential non-public data has been compromised by printing a document that contains the information. The investigating forensics team wants to audit the document trail from the host location to all instances of it being printed, and identify trace all access to the data stream, or the printed document. The forensic team also wants to know the times and locations that each person had access to the data.

3.2.8 Imaging Job Confidentiality

Bob would like to be able to generate an imaging job on one imaging device but have it rendered on a different imaging device. Both devices are connected via a network. The contents of the imaging job are confidential and should not be disclosed to unauthorized

parties capable of intercepting (either actively or passively) the job in transit between the devices.

3.2.9 Tracking Imaging Device Usage

Bob would like to utilize an imaging device that is administratively controlled by Alice. Alice would like to unambiguously identify "who" is using the imaging device, based on identity credentials that have been previously issued to Bob.

3.2.10 Imaging Device Resource Access Control

Bob would like to utilize an imaging device administratively controlled by Alice. The imaging device is capable of multiple functions and consumes resources that Alice deems valuable. Alice would like to control which functions and consumables of the device Bob is capable of using,

3.3 Out of Scope

The following are considered out of scope for this specification:

1. Definition of new security encryption protocols
2. Definition of new authentication methods
3. Definition of new security policy definition languages and formats
4. Authentication of Network Connected devices

3.4 Design Requirements

The design for the Imaging Device Security Model should:

1. Define new Semantic Model elements and values to support identification of Users, Devices, Imaging Devices, Service, Jobs, and Documents.
2. Define new Semantic Model elements and values to support delegated resource access.
3. Provide recommendations for Imaging Device Security policies based on accepted security best practices.
4. Define methods for authentication, authorization, and access control using existing protocols and schema.
5. Provide the ability for vendors to add extensions to the Semantic Model Elements.

4. PWG Security Model

The PWG Security Model is based on the idea of defining and attaching a set of security attributes to the operations and data defined by other PWG specifications, such as imaging service, imaging operations, job tickets and documents. These security attributes provide

the information necessary to perform the basic security functions defined by the model: Identification, Authentication and Authorization.

The PWG Security Model can apply security requirements and credentials to different type of entities. This specification describes two types of security entities, the Security Actor, and a Security Object.

4.1 Security Functions

The IDS Model defines core security attributes and values for the identification, Authentication and Authorization of Imaging Systems. The security attributes and values can be applied to one or more Security Actors and are carried in a PWG Security Ticket.

4.1.1 Identification

Depending on the local site policy, authentication typically involves the identification of a Security Actor based on three factors: “what you know” such as a username and password; “what you have” such as presenting an ID card, a digital certificate, or entering a SecurID code; or “who you are” information such as fingerprint, palm print, Iris scan, facial scan, etc.

4.1.2 Authentication

The Identification of a Security Actor can easily be stolen or copied and should not be trusted without being authenticated. The Authentication of a Security Actor requires that the Identity information provided for an Actor, be combined with additional information, such as a password, PIN code or biological scan. The combination of this information can then be validated by a known and trusted authentication service or database.

4.1.3 Authorization

Depending on the local site access policy, an authenticated Security Actor may be restricted in what operations may be performed and what resources may be accessed. By defining the rights and permissions that belong to specific Actors, access control rules for a specific resource or operation, and requiring authorization to access the resources or perform an operation, a site can control access to those resources and capabilities. Authorization of an Actor for access to a resource or operation is then accomplished by validating the policy rights and restrictions for an Actor against the access policy for a resource or operation. This validation is performed by an Authorization Service or through a database.

4.2 Security Declaration Models

In order to provide clear, independent and transportable definitions for common PWG security requirements, a standard language must be used to express security requirements. While several standards for expressing security information exist, PWG security specifications will use the Extensible Access Control Markup Language (XACML) for describing Access Control and Authorization information. XACML is standard XML Schema that represents authorization and access policies [OASIS-XACML].

4.3 Security Actors

A security actor is an entity (i.e. a person or a software process) that attempts or requests to perform an action on some security object.

4.3.1 Device Actor

A device is a physical hardware entity, such as a smart phone, tablet, computer, or Imaging Device. Devices may perform actions as requesting access and authentication to a network. Such actions can be an allowed or disallowed within a Security Domain based on parameters provide by the device such as OS version, Device and System Health, and supported communication protocols and encryption levels, or the physical location of the device (GeoLocation), and thus the location of User or Services available on that device.

4.3.2 Service Actor

A Service is “a mechanism to enable access to one or more capabilities, where the access is provided using a prescribed interface and is exercised consistent with constraints and policies as specified by the service description.” [OASIS-SOA]

It may be a separate application executed by a user, or a process executing as part of a device operating system. In the context of this document, the Service is a visible entity that a User or another Service connects to in order to perform a function.

4.3.3 Client Actor

A Client is a software process that communicates with a service. A client may be an autonomous process or interact based on input from a User.

4.3.4 User Actor

An individual User of a device or service, usually a human, but could be a System Account. The Security attributes of a User are global to a particular Security Domain, but may be overridden by the attributes of the device currently being used by the User; i.e. while a User may be authorized to use a particular service, if they are accessing the service from a controlled location, as determined by the device being used, access may be denied.

4.4 Security Objects

A Security Object is an entity upon which some action or operation can be performed. The scope or allowable effect of the action may be limited or modified by a set of attributes applied to the object and action.

4.4.1 Device/System

In the PWG security model, a Device or System may also be an object to which an action can be directed.

4.4.2 Service

Similar to a device, a Service may also be viewed as an object that can be acted upon.

4.4.3 Job

Since many PWG specifications are concerned with the creation and processing of jobs, the PWG Security Model allows for the application of security attributes to a specific job.

4.4.4 Document

Similar to jobs, the PWG Security Model provides for the application of security attributes to a specific document.

4.5 Roles and Types

To assist in the definition and organization of allowed operations and capabilities, each User, Device and Service may be assigned to one or more specific roles used assign and categorize the capabilities and operation allowed. For this purpose, the following standard role definitions are provided. A specific implementation may add additional roles as desired.

4.5.1 User Roles

Role	Description
Administrator	A User who is authorized to manage all aspect of a Device or Service. .
FieldTechnician	A Field Technician is allowed to install physical devices and accessories. The Field Technician is also allowed to perform the installation and setup of imaging services.
GroupMember	A Group Member is allowed to access any operation and resources allowed for the assigned group
Guest	A User who has limited and temporary access to basic imaging functions such as print, fax or scan.
LocalUser	A User who is interacting with an Imaging Device or Service from within physical proximity to the Device or

	Service)
NetworkAdministrator	A User who is authorized to manage network configuration and access parameters of the Device and Services.
Operator	A User that has special rights on the Imaging Device. The Operator typically oversees the Imaging Device. The Operator is allowed to query and control the Imaging Device, Jobs and Documents based on site policy.
Owner	The User who owns a particular work object such as a Job, an Imaging Service or Sevice, or a Service registration.
ReadOnlyUser	This is a role that allows a User to only perform query and read operations on the managed elements.
RemoteUser	A User who is interacting with an Imaging Device or Service from a remote location (i.e. a location not within physical proximity to an Imaging Device)
SecurityAdministrator	A User who is authorized to manage security aspects of the Device and Services, such as defining access by User roles, installing security certificates, etc.
ServiceTechnician	A person responsible for repairing a malfunctioning Imaging Device, performing routine preventive maintenance, and other tasks that typically require advanced training on the device internals [RFC3805]
NormalUser	a User who is authorized to perform basic Imaging Operations
Proxy	A Client or process that is acting as an intermediary on behalf of a User or Service.

Table 1: User Roles

4.5.2 Client Roles

Role	Description
User	A client representing a User
Proxy	A process that is acting as an intermediary on behalf of another Client or Service
Vendor	A custom role defined by the system vendor.

Table 2 : Client Roles

4.5.3 Device Roles

Role	Description
Client	A device directly used by a User (i.e. tablet)
Server	Service provider

Table 3: Device Roles

4.5.4 Service Roles

Role	Description
Client	A Client of the Service
Server	A Service provider
Identification Service	A Service that provides identification information for an Actor, such as an HID Card processing service.
Key Distribution Service	A Service that supplies session tickets and temporary session keys, such as those used in the Kerberos authentication protocol.
Authentication Service	An Authentication Provider (e.g. a key generator or 2-factor device or service); A Service that can perform authentication of security Actors and Objects based on provide security attributes
Authorization Service	A Service that provides access control decisions
Directory Service	A Service that provides access to directory information, such as user names and accounts
Copy Service	An Imaging Service that provides hardcopy duplication of hardcopy documents
Print Service	An Imaging Service that provides for hardcopy printed output of digital information.
Scan Service	An Imaging Service that provides digital representation of a hardcopy documents
FaxOut Service	An Imaging Service that sends outbound Facsimile jobs
FaxIn Service	An Imaging Service that receives inbound Facsimile jobs
Resource Service	An Imaging Service that provides various Imaging resources, such as fonts and watermark images.
Transform Service	An Imaging Service that transforms digital input into another form of digital output
System Control Service	A service that provides control over other Imaging Services, such as scan and print, within a system

Table 4: Service Roles

4.5.5 Device Types

The PWG Security Model distinguishes between different types of computing devices.

Type	Description
Computer	A stationary general purpose computing device such as a desktop PC.
Mobile Device	A processing device that is primarily designed to be carried by a user, such as a laptop, smart phone or tablet computer.
Server	A computing device that provides one or more services

	for consumption by another Computer or User.
Embedded Device	A device that contains a special-purpose computing system.
Imaging Device	A device specifically designed to process imaging jobs, such as a printer, scanner, or MFD.

Table 5 : Device Types

5. Security Ticket

The PWG Security Ticket provides several collections of security information, organized into three collections, each collection describing the security parameters for each actor involved in a session or transaction. This specification provides an overview of the PWG Security Ticket. More detail information about specific security attributes can be found in the “Imaging Device Security Identification, Authentication and Authorization” specification [IDS-IAA].

In this specification, the PWG Security Ticket is expressed using an abstract model based on XML Schema and SOAP. Other Protocol Bindings for the PWG Security Ticket are not defined by this document.

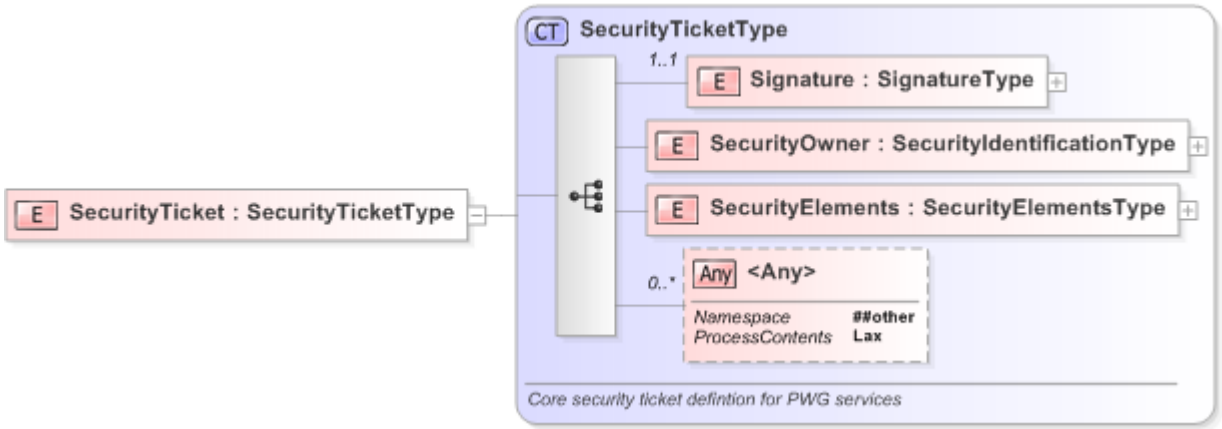


Figure 1: Security Ticket

5.1 Signature

The Signature element provides validation that the Security Ticket has not been compromised. It is an XML signature element as specified in XML signature Syntax and Processing [W3C-XML-DSIG] [RFC3275]. Question: Which reference do we want to use? The W3C reference is an updated version of the RFC

5.2 Security Owner

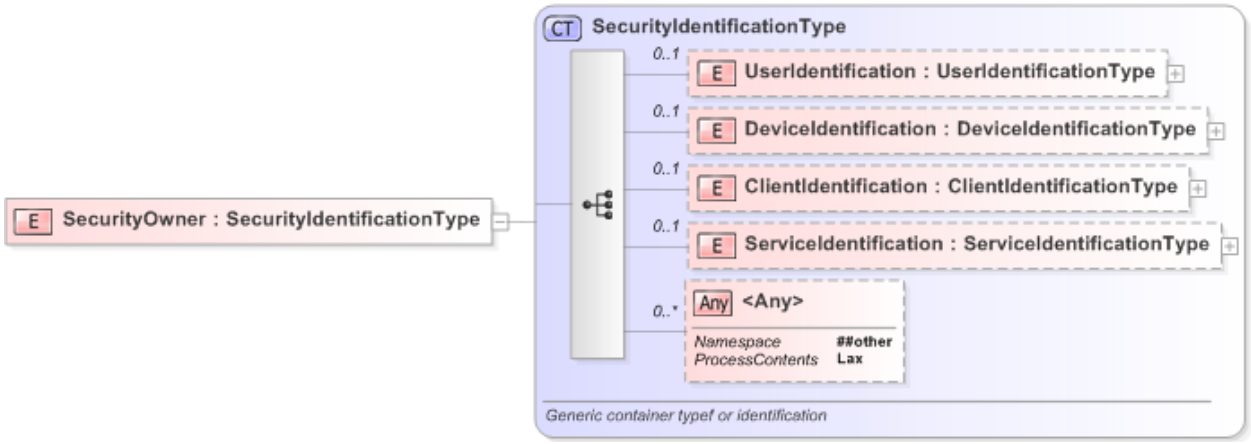


Figure 2: Security Owner

The SecurityOwner element contains Security Identification element for the entity that created the security ticket. The SecurityOwner may consist of multiple Security Actors in tandem, and thus may be identified by multiple sets of Actor attributes:

User Information about the actual User, such as username, etc.

Device Information about the device currently being used for access

Client Information about any separate client process, application or tool that the User is using

Service Information about any Service being used.

Detailed information about each of these Security Identification elements can be found in IDS Identification, Authentication and Authorization specification [IDS-IAA].

5.3 Security Elements

The document defines a set of common security elements that are used in different contexts. These elements are organized into sets based on security actors.

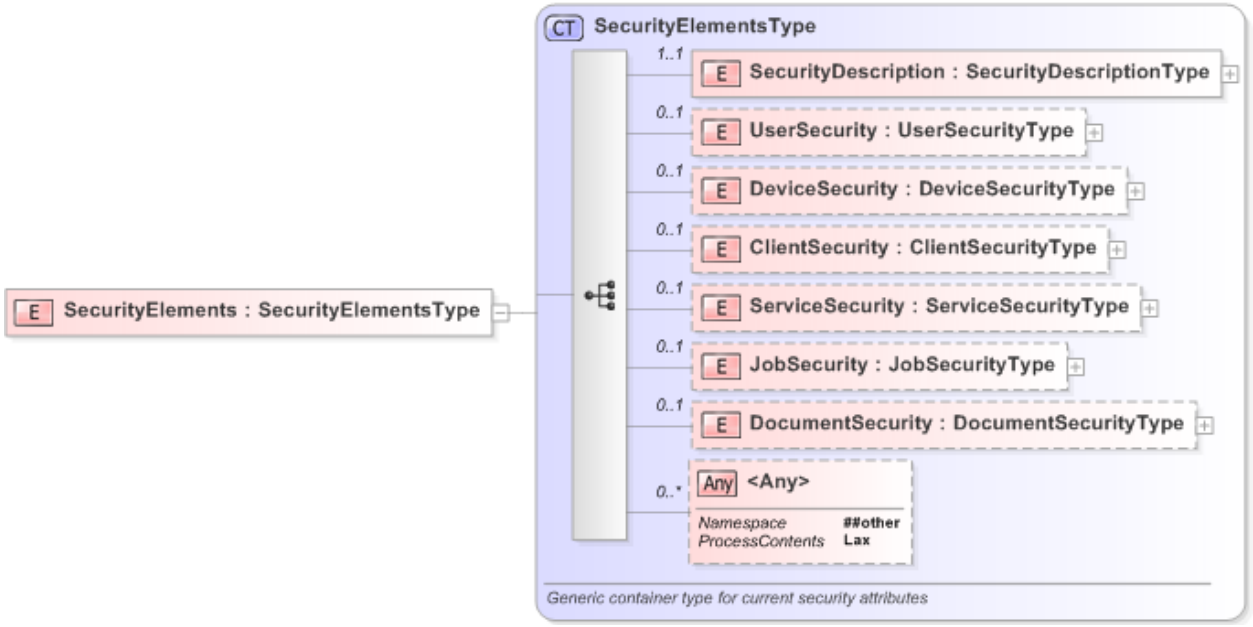


Figure 3: Security Elements

5.3.1 UserSecurity Elements

The UserSecurity element describes the security parameters for a specified User.

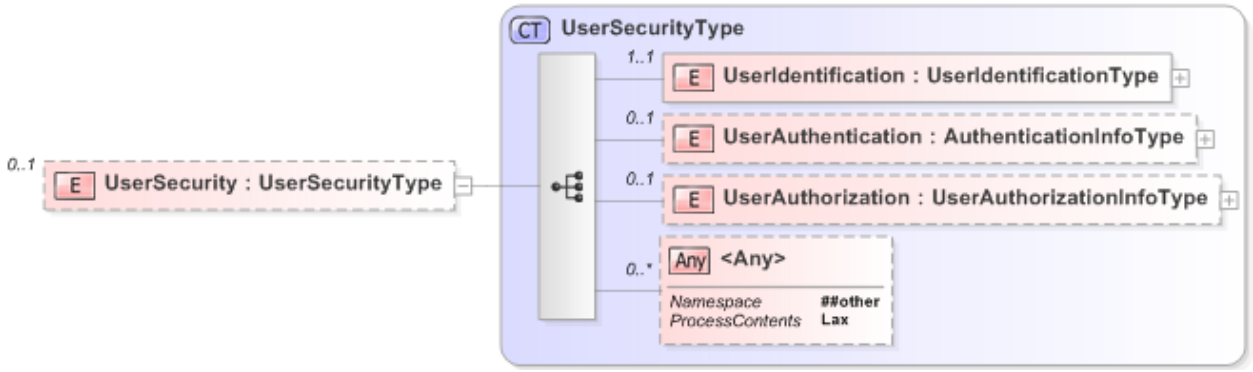


Figure 4: User Security

UserSecurity includes elements to provide information for the Identification, Authentication and Authorization (Access Rights) of the User.

5.3.1.1 UserIdentification

The UserIdentification element is a container for values and attribute that can be used to identify the User. Examples include a User's name, an account name, a User ID, an email address, etc.

5.3.1.2 UserAuthentication

The UserAuthentication element contains information that can be combined with corresponding UserIdentification information to prove that the User is who they say they are.

5.3.1.3 UserAuthorization

The UserAuthorization element is a container for values and attributes that may be used for authorization decisions, such as the location of the User.

5.3.2 DeviceSecurity Elements

The DeviceSecurity element provides the security attributes for a particular Device Actor or Object.

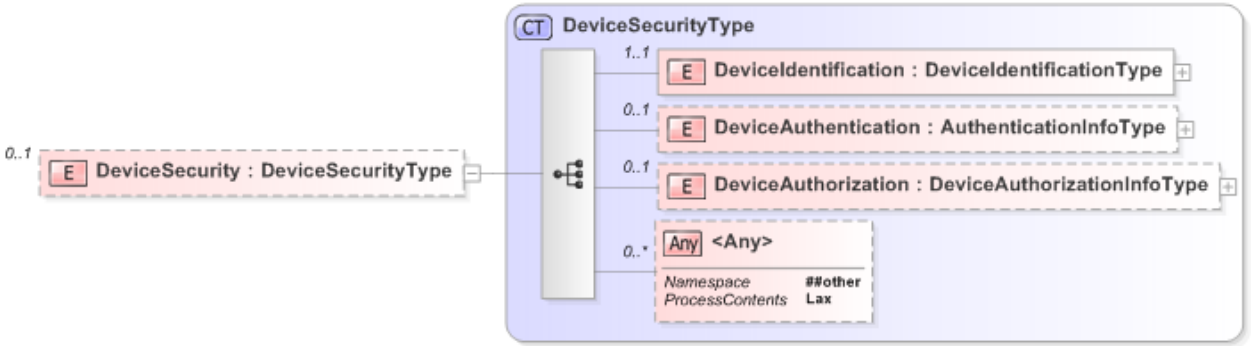


Figure 5: Device Security

DeviceSecurity includes elements to provide information for the Identification, Authentication and Authorization (Access Rights) of the Device.

5.3.2.1 DeviceIdentification

The DeviceIdentification element is a container for values and attribute that can be used to identify the Device. Examples include the DNS name of a device, the MAC or IPAddress, or a GUID value assigned to the Device.

5.3.2.2 DeviceAuthentication

The DeviceAuthentication element contains information that can be combined with corresponding DeviceIdentification information to confirm the identity of the Device.

5.3.2.3 DeviceAuthorization

The DeviceAuthorization element is a container for values and attributes that may be used for authorization decisions, such as the type or location of a Device.

5.3.3 ClientSecurity Elements

A ClientSecurity element provides the security attributes for a particular Client.

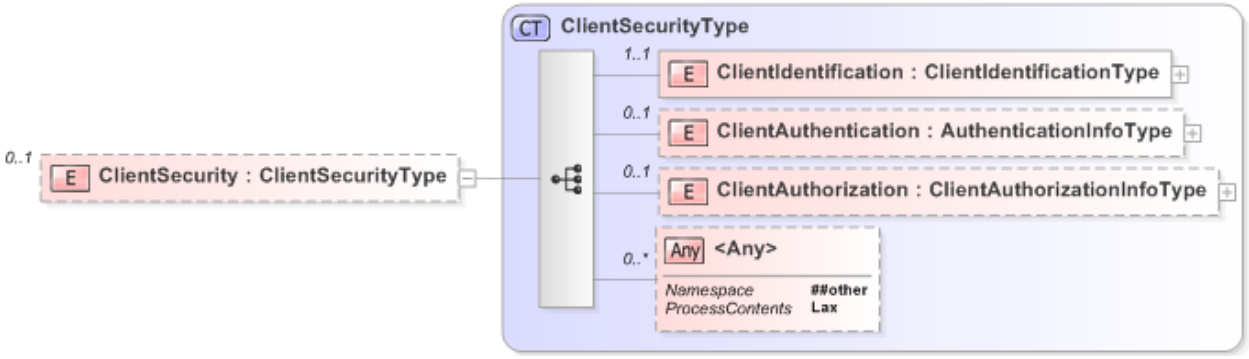


Figure 6: Client Security

ClientSecurity includes elements to provide information for the Identification, Authentication and Authorization (Access Rights) of the Client.

5.3.3.1 ClientIdentification

The ClientIdentification element is a container for values and attribute that can be used to identify the Client, such as a GUID value assigned to the Client.

5.3.3.2 ClientAuthentication

The ClientAuthentication element contains information that can be combined with corresponding ClientIdentification information to validate the Client.

5.3.3.3 ClientAuthorization

The ClientAuthorization element is a container for values and attributes that may be used for authorization decisions, such as the type or location of Client.

5.3.4 ServiceSecurity Elements

A ServiceSecurity element provides the security attributes for a particular service actor or object. This Service may be a logical entity on a device such as a Print Service on an MFD, or may be a remote Service such as a Web Service.

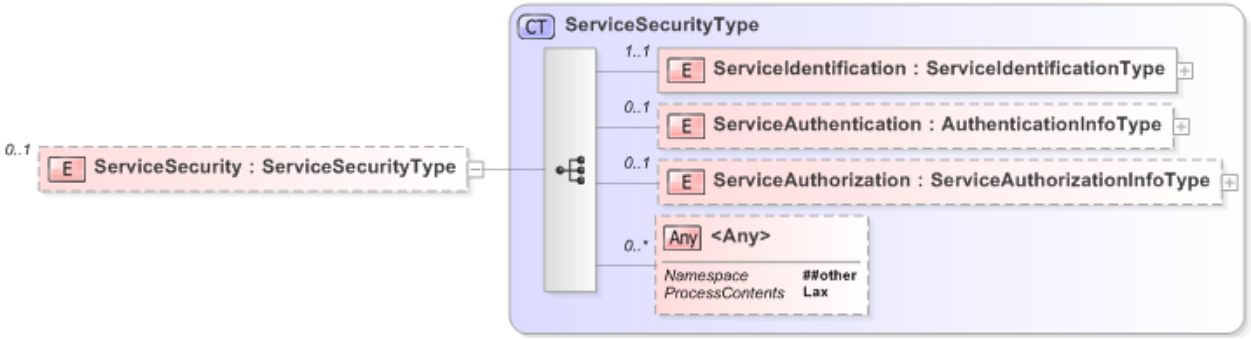


Figure 7: Service Security

ServiceSecurity includes elements to provide information for the Identification, Authentication and Authorization (Access Rights) of the Service.

5.3.4.1 ServiceIdentification

The ServiceIdentification element is a container for values and attribute that can be used to identify the Service, such as a GUID value assigned to the Service.

5.3.4.2 ServiceAuthentication

The ServiceAuthentication element contains information that can be combined with corresponding ServiceIdentification information to validate the Service.

5.3.4.3 ServiceAuthorization

The ServiceAuthorization element is a container for values and attributes that may be used for authorization decisions, such as the type or location of Service.

5.3.5 JobSecurity Elements

The JobSecurity element contains the authentication attributes that control access to the Job information.

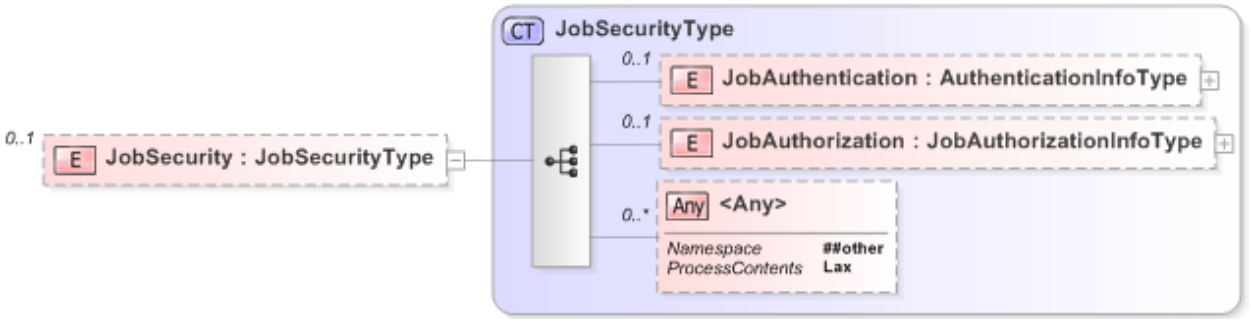


Figure 8: Job Security

JobSecurity includes elements to provide information for the Authentication and Authorization (Access Rights) of the Job.

566 **5.3.5.1 JobAuthentication**

567 The JobAuthentication element contains information to validate the Job, such as a
568 certificate to verify that the Job was created by a trusted User or Client.

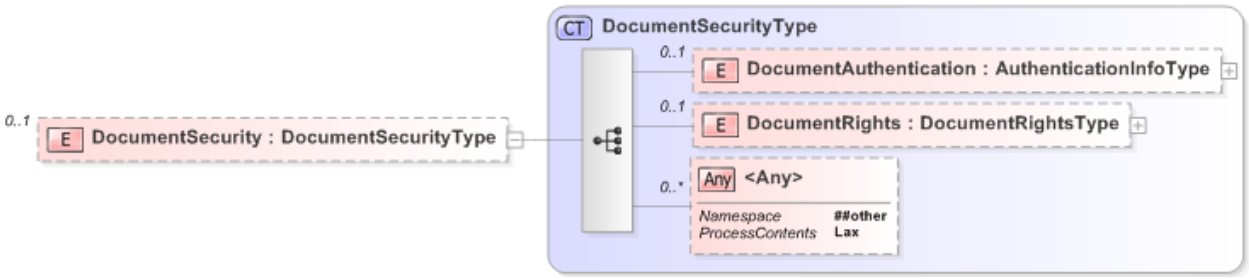
569 **5.3.5.2 JobAuthorization**

570 The JobAuthorization element is a container for values and attributes that may be used for
571 authorization decisions, such as the type of Imaging Services allowed to process a job.
572

573 **5.3.6 DocumentSecurity Elements**

574 The DocumentSecurity element contains the authentication and rights attributes that
575 control access to document content, including encryption access information.

576



577

578 **Figure 9: Document Security**

579 DocumentSecurity includes elements to provide information for the Authentication and
580 Authorization (Access Rights) of the document.
581

582 **5.3.6.1 Document Authentication**

583 The DocumentAuthentication element contains the authentication information necessary
584 for enable access to the document content. This information may range from a simple
585 document password to a document decryption token or key. It may also contain
586 information to verify that the Document was provide by a trusted User, Client or Imaging
587 Service.

588 **5.3.6.2 Document Rights**

589 The DocumentRights element contains the access and usage rights for the user, device or
590 service for a document provided in a document operation such as the UserGroups allowed
591 to print a document

6. Security Operations

The PWG IDS Security Model defines a small set of System level operations to access IDS Security Elements.

Question: Do we want to limit these operations to just the System/System Control Service or allow them to be addressed to each system service in order to ServiceSecurity Elements for each system service? Alternatively, we could define SystemSecurity Elements to only be applicable to external services, such as file storage, etc.

6.1 GetSecurityElements

The GetSecurityElements operation allows a client to obtain a list of all available security elements for a specified security actor. GetSecurityElements is a transactional operation and consists of a transaction request and a corresponding transaction response.

The request MUST provide at least one valid security identifier.

The response will contain the available security elements for all requested security identifies and types.

6.1.1 GetSecurityElementsRequest

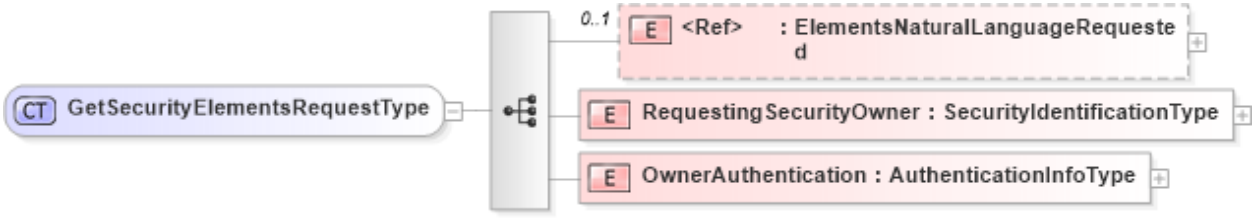


Figure 10: GetSecurityElement Request

The GetSecurityElementsRequest is issued by a Client or Service to obtain the security element values supported by another Client or Service.

6.1.1.1 ElementsNaturalLanguageRequested

Specifies the language, where appropriate, that the response values should be provide in

6.1.1.2 RequestingSecurityOwner

This element contains the Identification information for the Actor making the request.

6.1.1.3 RequestingSecurityOwnerAuthentication

This element contains the corresponding authentication information for the Actor making the request.

6.1.2 GetSecurityElementsResponse

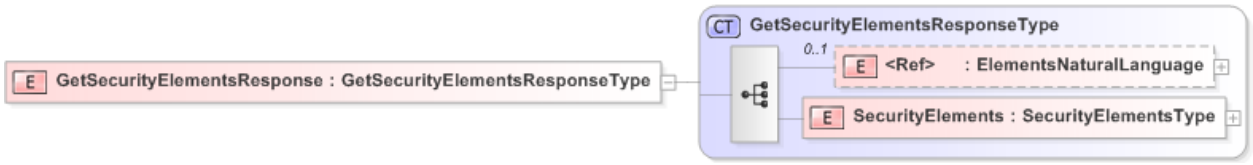


Figure 11: GetSecurityElement Response

6.1.2.1 ElementsNaturalLanguage

Identifies the language, where appropriate, that the response values are provide in

6.1.2.2 SecurityElements

This element contains the security elements and values supported by the Actor.

7. Alerts and Notifications

In order to keep administrators and security monitoring tools informed, an Imaging Device or service MUST be able to provide security and status alerts. In addition to the alerts and messages defined in PWG 5107.3-2012: Printer MIB and IPP MFD Alerts [PWG5107.3] and PWG 5110.3-2013 - PWG Common Log Format [PWG5110.3], Imaging Device SHOULD support the alerts listed in the following sections.

7.1 Security Alerts

NOTE: Need to get final values and send registration to IANA

Security Alert	PrtAlertCodeTC Value
securityUserIdentificationError	550
securityUserAuthenticationError	551
securityUserAuthorizationError	552
securityDeviceIdentificationError	560
securityDeviceAuthenticationError	561
securityDeviceAuthorizationError	562
securityServiceIdentificationError	570
securityServiceAuthenticationError	571
securityServiceAuthorizationError	572
securityUnknownEntity	580
securityInvalidAuthenticationService	581
securityInvalidAuthorizationService	582

Table 7: Security Alert Codes

8. Conformance Requirements

Any binding must conform to the PWG Security Schema and must meet the design requirements outlined in 3.4.

9. Conformance Recommendations

9.1 IEEE2600-2008 Conformance

The IEEE2600-2008 standard [IEEE2600] defines security requirements for manufacturers, users, and others in the selection, installation, configuration, and usage of hardcopy devices including Imaging Devices. Imaging Devices SHOULD support the IEEE 2600-2008 standard.

9.2 Imaging Device health and network access

In order to support health assurance on such controlled networks, Imaging Devices SHOULD support the Imaging Device Security Health Attributes [PWG5110.1] and corresponding Network Access Control protocol bindings such as Network Access Protocol (NAP) [PWG5110.2] and Trusted Network Connection (TNC) [IDS-TNC].

9.3 Audit Log Generation and Availability

Generating audit log records and making them available for review and analysis by Administrators or Auditors are the most basic common security requirements for all Imaging Device operational environments. To support the auditing of imaging operations, Imaging Devices SHOULD support the logging requirements as described in PWG Common Log Format [PWG5110.3].

10. Internationalization Considerations

For interoperability and basic support for multiple languages, conforming implementations MUST support the Universal Character Set (UCS) Transformation Format -- 8 bit (UTF-8) [RFC3629] encoding of Unicode [UNICODE] [ISO10646] and the Unicode Format for Network Interchange [RFC5198].

11. Security Considerations

Although security considerations specific to each Imaging Service may be discussed in the specification for the Service Model, the following considerations are generally applicable.

11.1 Protection of End User's Data

An Imaging Device receives, creates, and processes a User's Job and Document according to the User's intent configured in their Job and Document tickets. The Job and Document and their associated ticket information may contain sensitive data such as a Document that is classified as top secret, and where the Job and Document is to be routed or stored after completion according to a local security policy. In addition to routing a completed User's Job and Document over the network, User's sensitive Job and Document data may be received over the network from a remote PC or client station. In order to protect User's data stored in an Imaging Device or in-transit against disclosure or modification, security measures can be implemented by an Imaging Device according to a local site's security policy.

Additionally, an Imaging Device SHOULD provide:

- Access Control for on-device Data storage: Any user data stored by the Imaging Device, on internal storage or external storage controlled by the Imaging Device, can be protected by a minimum of User-level access control.

- Protection of data at rest: Any user data stored by the Imaging Device, on internal storage or external storage controlled by tImaging Device, can be encrypted while stored.

- Protection of data in transit: Provide confidentiality of data in transit using an protected end-to-end data path, such as provided by TLS encryption [RFC5246] or by encrypting the data prior to transport.

- Protection of data in use. Decrypted data that is stored in memory but not being actively used is protected.

12. IANA and PWG Considerations

This specification is consistent with the PWG Semantic Model Version 3.0 XML Schema [PWG-SCHEMA]

Printer MIB alert coded and corresponding state reason in IPP – see 5107.3 for examples

13. References

13.1 Normative References

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15. Change History

April 2, 2011

Initial revision.

May 24, 2011

Added Roles, Alerts.

Added security considerations, etc.

October 5, 2011

Include Security Alerts from MFD Alerts

April 25, 2012

Updated Use Cases

Reformatted Roles and Alerts tables

June 5, 2012

Updated User Roles

August 3, 2012

Editorial Updates

Updated missing entries from change history

Add terminology and section on visibility

Removed Web Services Binding section

October 20, 2013

Rewrote section on visibility

Added proposed values for organization, device and service role definitions

February 5, 2014

Converted to new PWG template

February 28, 2014

Simplified document objective and moved IAA details to IAA document

April 10, 2014

Made changes requested from last review. Cleaned up and reorganized.

May 10, 2014

Made changes requested from last review. Added Client actor. Added Device as an object. Added new Types section. Updated all schema diagrams to match latest schema changes. Removed old Security Consideration section and moved parts into Conformance Requirements. Added missing Normative references. Added JobSecurity element

July 10, 2014

Made changes requested from last review. Updated schema diagrams to match latest schema changes. Change SecurityId to SecurityOwner in the SecurtyTicket

July 28, 2014

Made changes requested from conference call review.

August 04, 2014

- Made changes requested from conference call review.
- Added Security operations
- Added Document security section
- Moved Identification detail back to the IAA specification
- Updated all schema diagrams to match latest schema changes.

- Added missing normative references.
- Filled in text description in several sections

November 1, 2014

- Made changes requested from F2F review.
- Merged Service Roles into Service Type and updated schema to match
- Updated all schema diagrams to ones generated by Liquid XML for consistencey with PWG specifications.
- Filled in text description in several sections
- Added references to RFC3995, RFC3275 and PWG Schema

