IMS Access For All Personal Needs and Preferences Description for Digital Delivery Information Model

Final Release

Version 2.0

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1 Scope

This part of the Access For All Specification provides a common information model for describing the learner or user needs and preferences when accessing digitally delivered resources or services. This description is one side of a pair of descriptions used in matching user needs and preferences with digital delivery. This model divides the personal needs and preferences of the learner or user into three categories:

a) Display: how resources are to be presented and structured;

b) Control: how resources are to be controlled and operated; and,

c) Content: what supplementary or alternative resources are to be supplied.

This part of the Access For All Specification is intended to meet the needs of learners with disabilities and of anyone in a disabling context.

The purpose of this part of Access For All Specification is to provide a machine-readable method of stating user needs and preferences with respect to digitally based education or learning. This part of Access For All Specification can be used independently, for example to deliver the required or desired user interface to the learner/user, or in combination with Access For All Specification Digital Resource Description to deliver digital resources that meet a user's needs and preferences.

This document is based upon the original ISO/IEC 24751-1:2008 *Information technology — Individualized adaptability and accessibility in e-learning, education and training — Part 2: "Access For All Personal Needs and Preferences for Digital Delivery"*. The ISO/IEC 24751-1:2008 document was a further development of the original IMS GLC Access For All Learner Information Package Specification, July 2003. The key changes from the ISO/IEC equivalent document are (note that these changes are documentation in nature and the technical solution is faithfully reproduced):

- The ISO/IEC Annex A has been removed and the subsequent appendices renumbered. This annex consisted of the French equivalents;
- The ISO/IEC Section 6 and 7 have been combined into a new Section 6 to contain all of the formal description of the information model. Also, this model is described using the Unified Modelling Language representation as defined in the IMS GLC Specification Note 07: UML Profile for Platform Independent Model Descriptions of Specifications for Data Models.

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.

2.1 ISO/IEC

ISO 639-2:1998 (E/F), *Codes for the representation of names of languages — Part 2: Alpha-3 code/Codes pour la représentation des noms de langue — Partie 2: Code alpha-3*

2.2 Referenced specifications

IETF RFC 3986 Uniform Resource Identifier (URI): Generic Syntax [RFC 3986], {http://www.ietf.org/rfc/rfc3986.txt}

3 Terms and Definitions

For the purposes of this document, the following terms and definitions apply.

3.01
access for all
AfA
approach to providing **accessibility** in a computer-mediated environment in which the **digital resources** and their method of delivery are matched to the needs and preferences of the user.

[ISO/IEC 24751-1:2008 (2.1)]

3.02
accessibility
usability of a product, service, environment or facility by **individuals** with the widest range of capabilities.

NOTE 1 Although "accessibility" typically addresses users who have a disability, the concept is not limited to disability issues.

NOTE 2 Adapted from ISO/TS 16071:2003 (3.2).[1]

3.03
access mode
human sense perceptual system or cognitive faculty through which a user may process or perceive the content of a **digital resource**.

[ISO/IEC 24751-1:2008 (2.3)]

3.04
adaptation
⟨ e-learning⟩ **digital resource** that presents the **intellectual content** of all or part of another **digital resource**.

NOTE Adaptations can also include the adjustment of the presentation, control methods, access modes, structure and user supports.

[ISO/IEC 24751-1:2008 (2.5)]

3.05
AfA context particular situation or environment in which a set of **AfA accessibility** needs and preferences might be used.

3.06
AfA contextual description name or description of a context in which a set of **AfA accessibility** needs and preferences might be used.

EXAMPLE A label for a particular location such as home, work or school, or a particular time of day such as evening.

NOTE See 5.4 for more information.

3.07
AfA hazard
characteristic of a **digital resource** that can be specified as being dangerous to a user.

EXAMPLE Flashing animations can trigger seizures in people with photosensitive epilepsy.

NOTE See the coded domain in A.17.

[1] The source for this adapted definition from ISO/TS 16071:2003 is now ISO/IEC 24751-1:2008 (2.2).

3.08
AfA preference
specific preference of an **individual** who requires **AfA accessibility**.

NOTE See 5.5.

3.09
AfA preference set
defined combination of two or more **AfA preferences**.

3.10
application parameter
set of **application specific** values for a particular **assistive technology**.

3.11
application specific
configuration of an **assistive technology** that involves **application parameters** unique to a particular **assistive technology** product.

NOTE See 5.6 for more information.

3.12
assistive technology
alternative access system
specialized software and/or hardware used in place of or in addition to commonly used software or hardware for control, **display** or processing.

EXAMPLES Screen reader, alternative keyboard, refreshable Braille device, screen magnifier.

[ISO/IEC 24751-1:2008 (2.8)]

3.13
digital resource
DR
any type of resource that can be transmitted over and/or accessed via an **information technology system**.

NOTE A digital resource can be referenced via an unambiguous and stable identifier in a recognized identification system (e.g. ISBN, ISAN, UPC/EAN, URI).

[ISO/IEC 24751-1:2008 (2.11)]

3.14
disability
⟨ digital resource delivery⟩ any obstacle to the use of a **digital resource** experienced because of a mismatch between the needs of a user and the **digital resource** delivered.

NOTE 1 Disability in an AfA context is not a personal trait but a consequence of the relationship between the user and their resource system.

NOTE 2 In an e-learning context, disability refers to a mismatch between the needs of a learner and both the educational resource and/or the method of delivery.

[ISO/IEC 24751-1:2008 (2.13)]

3.15 disability
⟨ medical perspective⟩ any restriction or lack (resulting from an **impairment**) of ability to perform an activity in the manner or within the range considered normal for a human being.

NOTE 1 This definition of "disability" is included to ensure that users who may have "legal rights" to assistive technologies are served.

NOTE 2 Adapted from World Health Organization Document A29/INFDOCI/1, Geneva, Switzerland, 1976.

3.16
display
rendering or presentation of a user interface and/or **digital resource** in a range of **access modes**.

NOTE Access modes include, but are not limited to, visual, auditory, olfactory, textual and tactile.

[ISO/IEC 24751-1:2008 (2.15)]

3.17
display transformability
characteristic of a **digital resource** that supports changes to specific aspects of its **display**.

NOTE See the coded domain in A.2.

[ISO/IEC 24751-1:2008 (2.16)]

3.18
display transformation
DT
restyling or reconfiguration of the rendering or presentation of a user interface and/or **digital resource**.

[ISO/IEC 24751-1:2008 (2.17)]

3.19
generic assistive technology configuration
configuration of an **assistive technology** that involves application parameters common among similar technologies, and not exclusive to a particular product.

NOTE See 5.6.

3.20
impairment
⟨ medical perspective⟩ any loss or abnormality of psychological, physiological, or anatomical structure or function.

NOTE Adapted from World Health Organization Document A29/INFDOCI/1, Geneva, Switzerland, 1976.

3.21
individual
human being, i.e. a natural person, who acts as a distinct indivisible entity or is considered as such.

NOTE Adapted from ISO/IEC 15944-1:2002 (3.28).

3.22
information technology system IT system
set of one or more computers, associated software, peripherals, terminals, human operations, physical processes, information transfer means, that form an autonomous whole, capable of performing information processing and/or information transfer.

[ISO/IEC 14662:2004 (3.1.8)]

3.24
language
system of signs for communication, usually consisting of a vocabulary and rules.

NOTE In this part of ISO/IEC 24751, language refers to “natural languages” or “special languages” but not “programming languages” or “artificial languages”.

[ISO 5127:2001 (1.1.2.01)]

4 Symbols and Abbreviations

The following abbreviations and acronyms are used in this document.

AfA	Access for All
DCMI MT	Dublin Core Metadata Initiative Metadata Terms
DR	Digital Resource
DRD	access for all Digital Resource Description
DT	Display Transformation
IEEE	Institute of Electronic & Electrical Engineering
IMS	IMS Global Learning Consortium
ISAN	International Standard Audiovisual Number
ISBN	International Standard Book Number
ISO/IEC	International Standards Organisation/International Electrotechnical Commission
IT system	Information Technology system
LIP	Learner Information Package
MIME	Multipurpose Internet Mail Extensions
PIM	Platform Independent Model
PNP	access for all Personal Needs and Preferences
TILE	The Inclusive Learning Exchange
UML	Unified Modelling Language
UPC/EAN	Universal Product Code / European Article Number
URI	Uniform Resource Identifier
W3C	World Wide Web Consortium
W3C/WAI WCAG	W3C/Web Accessibility Initiative Web Content Accessibility Guidelines
XML	Extensible Mark-up Language
XSLT	XML Style Sheet Transform

5 Basic Principles

A number of concepts are encapsulated in the information model for this part of the Access For All Specification. These concepts are explained below.

5.1 Functional Approach

The information collected as an Access For All Personal Needs and Preferences (PNP) description is associated with the user's functional abilities and the assistive technology or other non-standard technology in use as well as other user needs and preferences (a functional approach), rather than with the name and other details of a human impairment (a medical approach). If the structure were based on information about users' impairments, it would still need to address their functional abilities at some stage, as it is this information that is needed by learning systems to adapt content and navigation. A medical approach would exclude many of the details that the system would require. One example would be a user with a learning disability: because learning disabilities are so varied that classification does not capture the range of options that can be offered in a functional description. Another example would be the needs and preferences of a blind user: knowing that a user is blind (the medical terminology of the impairment) does not indicate whether or not they can read Braille or whether they need output to a Braille display or to a screen reader with speech; only a functional approach can do this. Many users with disabilities and users with alternate needs and preferences will require the user interface to be compatible with the assistive or non-standard technology that they use, so for them Access For All Needs and Preferences (PNP) are specific to the hardware and software used.

5.2 Creating a Personal Needs and Preferences Statement

The Access For All Personal Needs and Preferences (PNP) description can be created in a variety of ways. The most likely way is through an interactive form ('wizard') that presents a number of questions to the user and, given responses to the questions, generates the description. This application may be integrated into a content management system or offered as a stand-alone application. Once a person has a PNP, they should be able to change, expand, replace, or completely remove their user needs and preferences statement as needed. They should also be able to create multiple PNPs in order to have a convenient way to switch between several sets of needs and preferences for different situations e.g. at home, school, or in a quiet or noisy place. They should also be able to move their PNPs to new systems or new situations for reuse.

5.3 Display, Control and Content

Needs and preferences are grouped into display, control, and content elements. Display needs and preferences describe how the user prefers to have information displayed or presented. Control needs and preferences describe how a user prefers to control the device. Finally, content needs and preferences describe what supplementary, enhanced, adapted, or alternative content the learner requires.

5.4 Multiple Contexts

A learner may have one or more defined sets of needs and preferences. Multiple sets are necessary because a learner's needs and preferences may vary according to the learning context. Changing requirements may be caused by changes to their environment (for example, a home system may have different technologies installed from one at school) and/or other factors (for example, needs may vary later in the day as fatigue increases, or with specific disciplines such as science versus literature).

5.5 Needs and Preferences

This standard includes both needs and preferences because it is crucial to provide for and distinguish between them. As described in the Framework document, the interoperability requirements of learners with disabilities necessitate strong adherence, whenever possible, to the stated needs of each learner. However, to avoid having users over-specify by marking their preferred settings as needs, the standard incorporates a priority rating for each configuration or technology setting requested. This allows users to state, for example, that they prefer to use a keyboard (perhaps due to repetitive strain injury from "mouse" use) but that they can use a "mouse"-driven application when no adaptation is available. The ratings are:

- *required*: The learner cannot use content or tools that do not provide this feature or allow this transformation;
- *preferred*: The learner prefers content or tools that provide this feature or allow this transformation;
- *optionally use*: The learner would use this setting if the content or tool they have selected for other reasons provides or allows it;
- *prohibited*: The learner cannot use content or tools that include this feature or require this transformation; this feature should be turned off if possible, and content that includes this feature should not be offered.

5.6 Generic versus Application Specific

In general, any application within a particular class of alternative access systems will share some subset of functionality. For example, screen readers, in general, allow the users to set the rate at which text is read. In addition to this subset of common or generic functionality, many vendors add features that are unique to their application.

Access For All Personal Needs and Preferences (PNP) statements identify and separate these generic settings for different classes of alternative access systems, and provide a vendor-neutral way for users to state their needs and preferences for these settings. These generic settings are applicable to any application within the class. As well, the PNP provides a mechanism for vendors to define their own application-specific settings, (which may not be applicable to other vendors' applications) and for the user to request them.

6 Access For All Personal Needs and Preferences (PNP) for Digital Delivery Information Model

6.1 Key Terms and Concepts

Classes in this information model are classified into one of three types. These abstractions are bound to specific data structures for machine processing in the associated bindings. The abstract class types are:

- **container:** A container class may be a parent of one or more child classes;
- **value:** A value class shall not be a parent. That is, it shall not be a composite of characteristic, container, value, or unspecified class types. A value class shall always be a child of a container class and shall have semantic value within the scope of its parent class's semantic value;
- **unspecified: An unspecified class may be a parent.** An unspecified class serves as an extension point for this Information Model.

Table 6.1 lists the class descriptors used to describe the abstract classes and definitions of the descriptors.

Table 6.1 Class descriptors

Descriptor	Definition
Class name	The name given to the class being described.
Class type	The abstract class type of this class.
Data type	For value classes, the allowed structure for valid values for the class. Valid data types are: **Boolean:** The primitive, two-valued data type that uses the keywords "true" and "false" to indicate the logical state of an object. **Integer:** An integer. **NormalizedString:** A sequence of printable characters that does not contain carriage returns or tabs. **URI**: Any syntactically valid instance of a URI as defined in RFC3986. Note: Many of the foundational Specifications, Standards, and Recommendations referred to by this Information Model use RFC2396 and RFC2732 as the definitions of URI. These are made obsolete by RFC3986, but many of the foundational documents have not been updated to reference RFC3986.
Value space	The range of valid values for this class. If the value space is unspecified, it is not known or is not important.
Multiplicity	A property of a class indicating the number of times it may be used or appear in a given parent context. The values of this property are expressed as a range or shorthand for a range using this notation: • **'0..1'** [optional; restricted] • **'0..unbounded'** [optional; unrestricted] • **'1..1'** [mandatory; restricted] • **'1..unbounded'** [mandatory; unrestricted] Multiplicities may also appear in short-hand notation in the UML models. The short-hand equivalents shall be (exclusive of bracketed comments): • **'*'** [optional; unrestricted] • **'1'** [mandatory; restricted] • **'1..*'** [mandatory; unrestricted] Where multiplicity is greater than one, the importance of the ordering of siblings is also

Descriptor	Definition
	indicated by appending either **“,”ordered** or **“,” unordered.** **ordered** specifies a sequence of siblings as listed, **unordered** specifies a collection or bag of siblings for which the order is not important.
Scope	The scope of the attribute is define as either: • ‘-‘ denotes local; • ‘+’ denotes global. The appropriate symbol precedes the name of the attribute.
Parents	Lists classes that may be parents of this class.
Children	Lists the possible child classes of this class in the form **“[” child *“,” child “]”.** One or more child classes may be expressed within square brackets. Each child class shall be separated by a comma. Where more than one child is listed, the importance of the ordering of siblings is also indicated by appending either **“,”ordered** or **“,” unordered.** **ordered** specifies a sequence of siblings as listed. **unordered** specifies a collection or bag of sibling for which the order is not important.
Description	Contains descriptions relating to the class and its values space.

In general, this specification does not define the ways in which an end system must be realized. However, the required interoperability behavior requires that an end system have certain characteristics. The static properties of these characteristics are defined in this Section, including:

- When an attribute has a multiplicity of ‘1..1’ then an end system must be capable of supporting one instance;
- When an attribute has a multiplicity of ‘1..*’ then an end system must be capable of supporting at least one instance. The specification will also define the smallest permitted maximum number of instances that must also be supported by the end system;
- When an attribute has a multiplicity of ‘0..1’ then an end system should support a single instance;
- When an attribute has a multiplicity of ‘0..*’ then the specification will define the smallest permitted maximum number of instances that must also be supported by the end system.

6.2 Access_For_All_User Class Description

The PIM for the Access_For_All_User data model is shown in Figure 6.1.

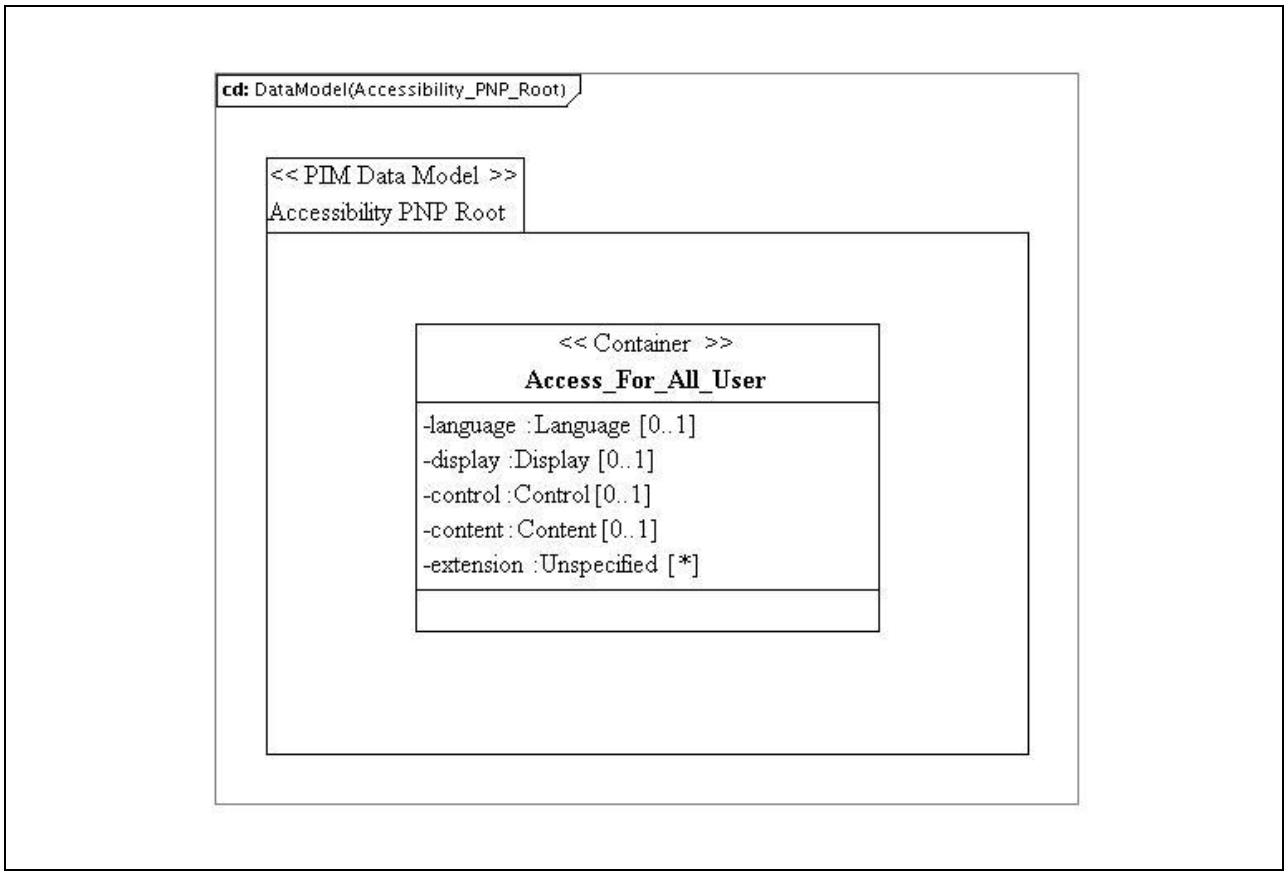


Figure 6.1 — Access_For_All_User class diagram.

Table 6.2 Description of the 'Access_For_All_User' class.

Descriptor	Definition
Class name	Access_For_All_User
Class type	Container
Parents	Root
Children	[language, display, control, content, extension], unordered
Description	Collection of AfA needs and preferences for control flexibility, display transformability and content with respect to the accessibility of a resource.

6.2.1 'Language' Attribute Description

Table 6.3 Description of the 'language' attribute for the Access_For_All_User class.

Descriptor	Definition
Attribute name	language
Data type	Normalized String.
Value space	A value from: ISO 639-2:1998
Multiplicity	[0..unbounded], unordered
Description	A preference for the **language** of the user interface [ISO 639-2:1998].

6.2.2 'Display' Attribute Description

Table 6.4 Description of the 'display' attribute for the Access_For_All_User class.

Descriptor	Definition
Attribute name	display
Data type	Display
Value space	Container
Multiplicity	[0..1]
Description	Collection of AfA needs and preferences for how a user interface and content should be presented.

6.2.3 'Control' Attribute Description

Table 6.5 Description of the 'control' attribute for the Access_For_All_User class.

Descriptor	Definition
Attribute name	control
Data type	Control
Value space	Container
Multiplicity	[0..1]
Description	Collection of needs and preferences for how to configure **alternative access systems** for controlling a device.

6.2.4 'Content' Attribute Description

Table 6.6 Description of the 'content' attribute for the Access_For_All_User class.

Descriptor	Definition
Attribute name	content
Data type	Content
Value space	Container
Multiplicity	[0..1]
Description	Collection of needs and preferences for content, specifying any desired transformations or enhancements.

6.2.5 'Extension' Attribute Description

Table 6.7 Description of the 'extension' attribute for the Access_For_All_User class.

Descriptor	Definition
Attribute name	extension
Data type	Unspecified
Value space	Defined in terms of how the Information Model is realized by a binding.
Multiplicity	[0..unbounded], unordered
Description	This is a placeholder. It informs bindings of this Information Model as to the valid locations for the inclusion that extend the parent class.

6.3 Display Class Description

The PIM for the Display data model is shown in Figure 6.2.

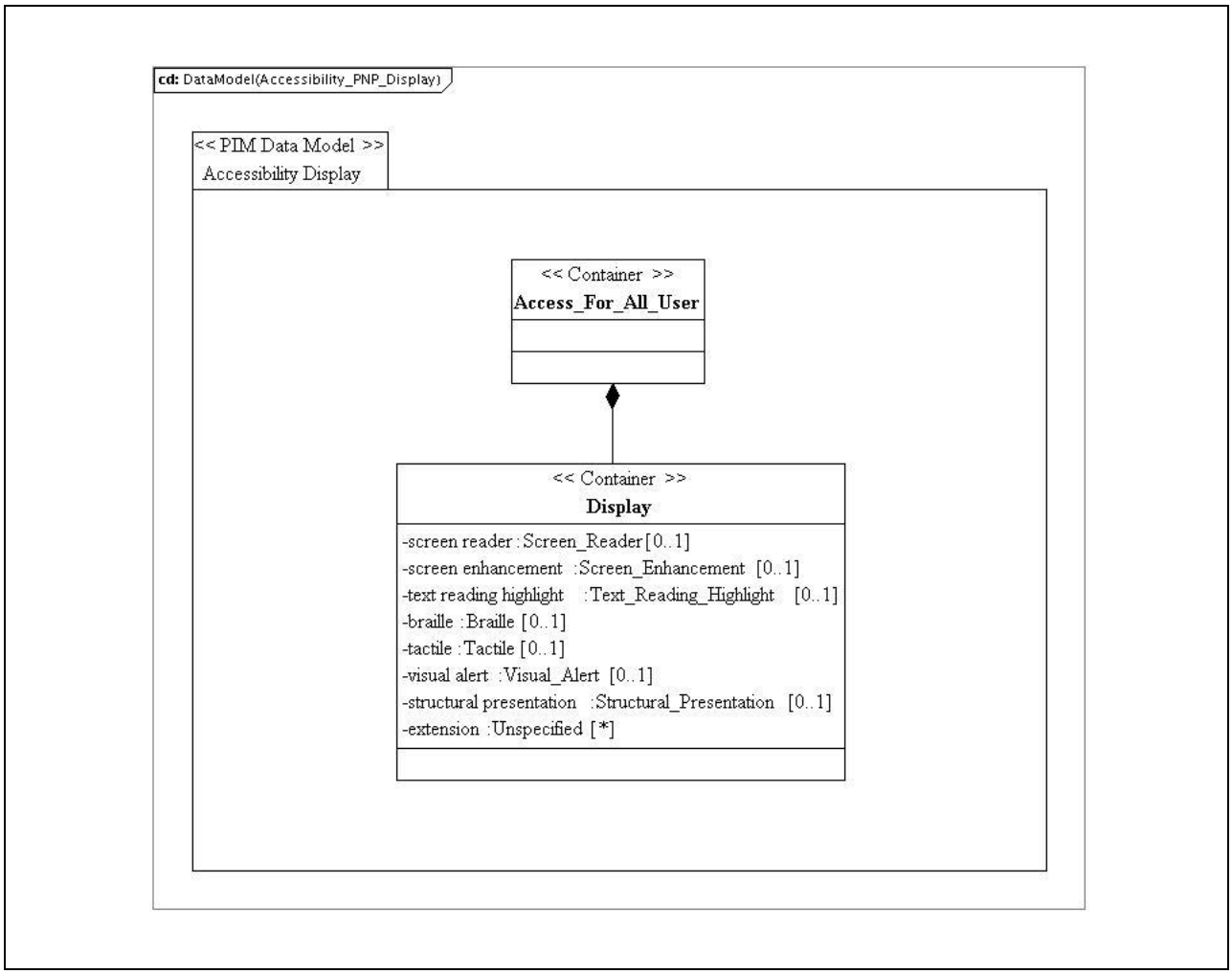


Figure 6.2 — Display class diagram.

Table 6.8 Description of the 'Display' class.

Descriptor	Definition
Class name	Display
Class type	Container
Parents	Access_For_All_User
Children	[screen reader, screen enhancement, text reading highlight, braille, tactile, visual alert, structural presentation, extension], unordered
Description	Collection of AfA needs and preferences for how a user interface and content should be presented.

6.3.1 'Screen Reader' Attribute Description

Table 6.9 Description of the 'screen reader' attribute for the Display class.

Descriptor	Definition
Attribute name	screen reader
Data type	Screen_Reader
Value space	Container
Multiplicity	[0..1]
Description	Collection of AfA needs and preferences for how to configure a *screen reader*[2].

6.3.2 'Screen Enhancement' Attribute Description

Table 6.10 Description of the 'screen enhancement' attribute for the Display class.

Descriptor	Definition
Attribute name	screen enhancement
Data type	Screen_Enhancement
Value space	Container
Multiplicity	[0..1]
Description	Collection of AfA needs and preferences for how to configure enhancements to a screen **display**.

6.3.3 'Text Reading Highlight' Attribute Description

Table 6.11 Description of the 'text reading highlight' attribute for the Display class.

Descriptor	Definition
Attribute name	text reading highlight
Data type	Text_Reading_Highlight
Value space	Container
Multiplicity	[0..1]
Description	Collection of AfA needs and preferences for how to configure a *text reading and highlighting* system.

[2] Italicized terms are defined in ISO/IEC 24751-1:2008.

6.3.4 'Braille' Attribute Description

Table 6.12 Description of the 'braille' attribute for the Display class.

Descriptor	Definition
Attribute name	braille
Data type	Braille
Value space	Container
Multiplicity	[0..1]
Description	Collection of needs and preferences for how to configure a *Braille display*.

6.3.5 'Tactile' Attribute Description

Table 6.13 Description of the 'tactile' attribute for the Display class.

Descriptor	Definition
Attribute name	tactile
Data type	Tactile
Value space	Container
Multiplicity	[0..1]
Description	Collection of needs and preferences for how to configure a *tactile display*.

6.3.6 'Visual Alert' Attribute Description

Table 6.14 Description of the 'visual alert' attribute for the Display class.

Descriptor	Definition
Attribute name	Visual alert
Data type	Visual_Alert
Value space	Container
Multiplicity	[0..1]
Description	Collection of needs and preferences for how to configure *visual alerts*.

6.3.7 'Structural Presentation' Attribute Description

Table 6.15 Description of the 'structural presentation' attribute for the Display class.

Descriptor	Definition
Attribute name	structural presentation
Data type	Structural_Presntation
Value space	Container
Multiplicity	[0..1]
Description	Collection of needs and preferences for how the structure of content should be displayed Value.

6.3.8 'Extension' Attribute Description

Table 6.16 Description of the 'extension' attribute for the Display class.

Descriptor	Definition
Attribute name	extension
Data type	Unspecified
Value space	Defined in terms of how the Information Model is realized by a binding.
Multiplicity	[0..unbounded], unordered
Description	This is a placeholder. It informs bindings of this Information Model as to the valid locations for the inclusion that extend the parent class.

6.4 Screen_Reader Class Description

The PIM for the Display data model is shown in Figure 6.3.

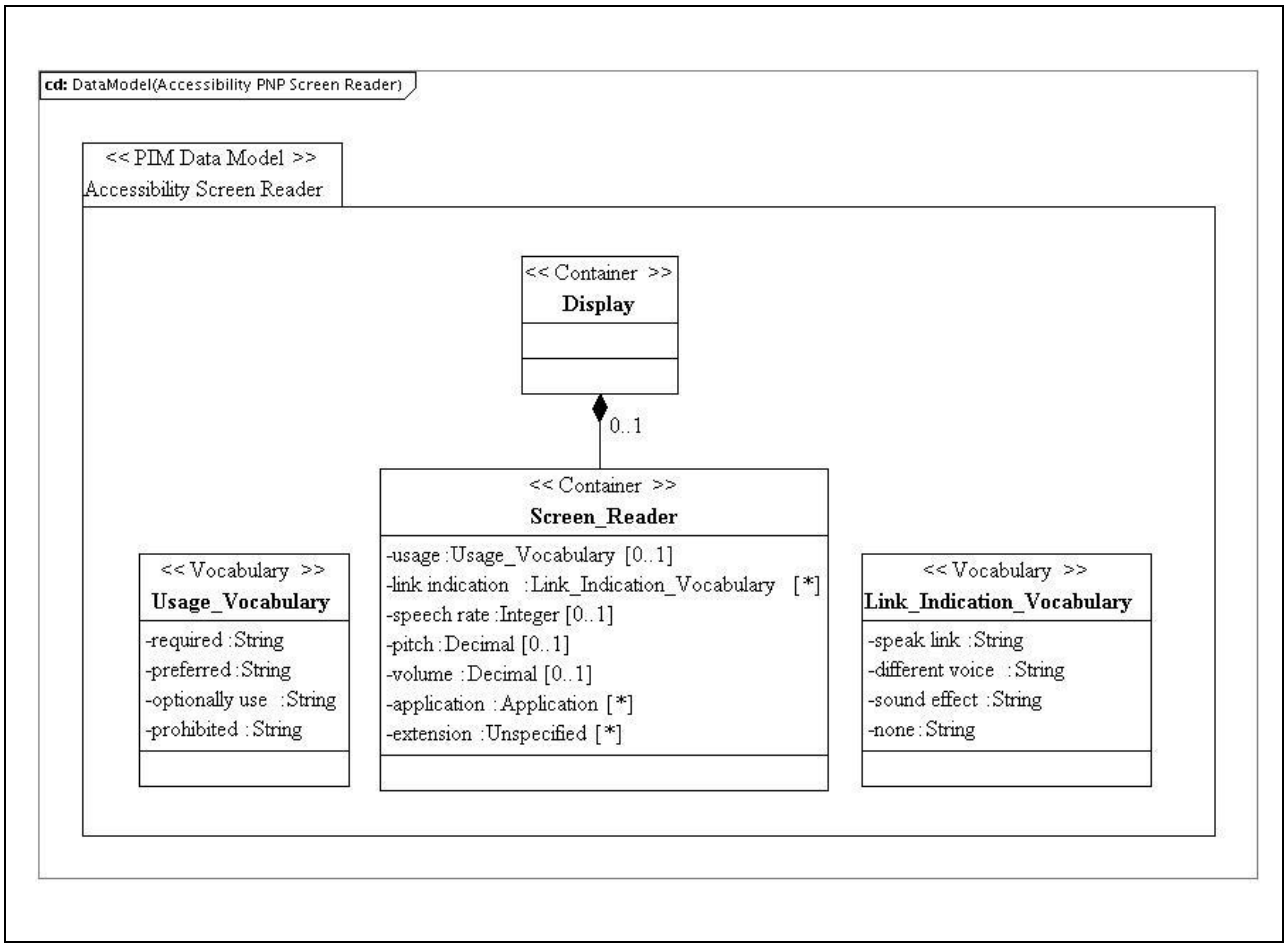


Figure 6.3 — Screen_Reader class diagram.

Table 6.17 Description of the 'Screen_Reader' class.

Descriptor	Definition
Class name	Screen_Reader
Class type	Container
Parents	Display
Children	[usage, link, speech rate, pitch, volume, application, extension], unordered
Description	Collection of AfA needs and preferences for how to configure a *screen reader*.

6.4.1 'Usage' Attribute Description

Table 6.18 Description of the 'usage' attribute for the Screen_Reader class.

Descriptor	Definition
Attribute name	usage
Data type	Enumerated vocabulary: Usage_Vocabulary
Value space	The enumerated vocabulary is: { required | preferred | optionally use | prohibited }. Default=preferred.
Multiplicity	[0..1]
Description	Rating for the collection of AfA needs and preferences. The value space for this vocabulary is approved by IMS GLC. The syntax and semantics of the approved list of terms shall be supported by all software components implementing this Information Model. The value space for the vocabulary may be extended. Such extensions may be created and used only when no approved IMS GLC value satisfies the expressive need of an implementing community to define the shape of a collection.

6.4.2 'Link Indication' Attribute Description

Table 6.19 Description of the 'link indication' attribute for the Screen_Reader class.

Descriptor	Definition
Attribute name	Link indication
Data type	Enumerated vocabulary: Link_Indication_Vocabulary
Value space	The enumerated vocabulary is: { speak link | different voice | sound effect | none }. Default=speak link.
Multiplicity	[0..unbounded], unordered
Description	The characteristics of presentation for a hyperlink when using a *screen reader*. The value space for this vocabulary is approved by IMS GLC. The syntax and semantics of the approved list of terms shall be supported by all software components implementing this Information Model. The value space for the vocabulary may be extended. Such extensions may be created and used only when no approved IMS GLC value satisfies the expressive need of an implementing community to define the shape of a collection.

6.4.3 'Speech Rate' Attribute Description

Table 6.20 Description of the 'speech rate' attribute for the Screen_Reader class.

Descriptor	Definition
Attribute name	speech rate
Data type	Integer
Value space	≥ 1 (words per minute). Default=180.
Multiplicity	[0..1]
Description	Rate of speech of a *speech synthesizer*. Note: A *speech synthesizer* may be used by or with a number of technologies, including a *screen reader*, *text reader/highlighter* or *Braille display*, among others.

6.4.4 'Pitch' Attribute Description

Table 6.21 Description of the 'pitch' attribute for the Screen_Reader class.

Descriptor	Definition
Attribute name	pitch
Data type	Decimal (10,4)
Value space	0.0 ≤ pitch ≤ 1.0. Default=0.5.
Multiplicity	[0..1]
Description	Pitch of a *speech synthesizer*. NOTE 1: A *speech synthesizer* may be used by or with a number of technologies, including a *screen reader*, *text reader/highlighter* or *Braille display*, among others. NOTE 2: Use 0.0 = "low", 0.5 = "medium", 1.0 = "high".

6.4.5 'Volume' Attribute Description

Table 6.22 Description of the 'volume' attribute for the Screen_Reader class.

Descriptor	Definition
Attribute name	volume
Data type	Decimal (10,4)
Value space	0.0 ≤ pitch ≤ 1.0. Default=0.5.
Multiplicity	[0..1]
Description	Volume of a *speech synthesizer*. NOTE 1: A *speech synthesizer* may be used by or with a number of technologies, including a *screen reader*, *text reader/highlighter* or *Braille display*, among others. NOTE 2: Use 0.0 = "low", 0.5 = "medium", 1.0 = "high".

6.4.6 'Application' Attribute Description

Table 6.23 Description of the 'application' attribute for the Screen_Reader class.

Descriptor	Definition
Attribute name	application
Data type	Application
Value space	Container
Multiplicity	[0..unbounded], unordered
Description	Collection of needs and preferences for how to configure vendor-specific parameters of an **assistive technology.**

6.4.7 'Extension' Attribute Description

Table 6.24 Description of the 'extension' attribute for the Screen_Reader class.

Descriptor	Definition
Attribute name	extension
Data type	Unspecified
Value space	Defined in terms of how the Information Model is realized by a binding.
Multiplicity	[0..unbounded], unordered
Description	This is a placeholder. It informs bindings of this Information Model as to the valid locations

Descriptor	Definition
	for the inclusion that extend the parent class.

6.5 Screen_Enhancement Class Description

The PIM for the Display data model is shown in Figure 6.4.

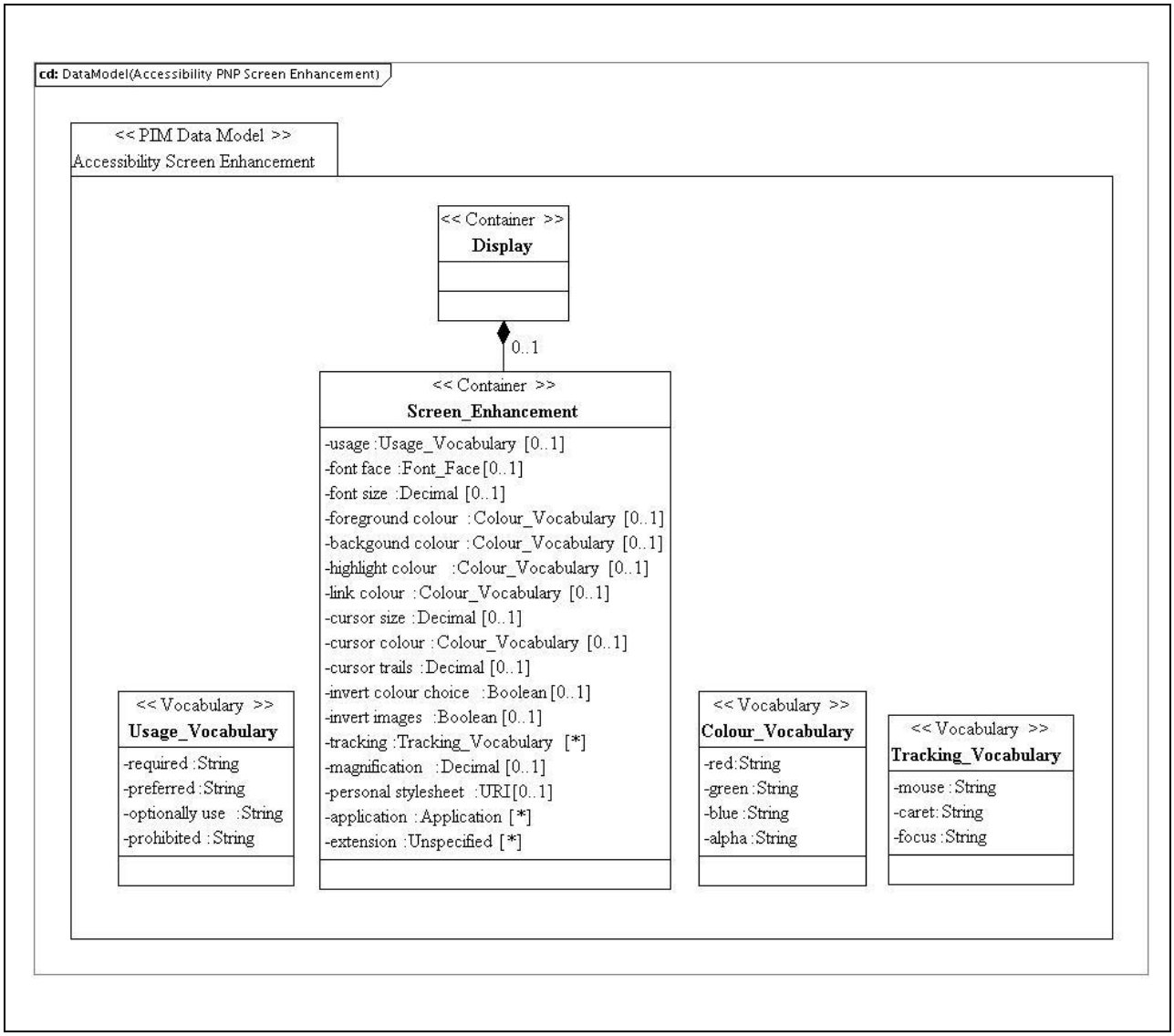


Figure 6.4 — Screen_Enhancement class diagram.

Table 6.25 Description of the 'Screen_Enhancement' class.

Descriptor	Definition
Class name	Screen_Enhancement
Class type	Container
Parents	Display
Children	[usage, font face, font size, foreground colour, background colour, highlight colour, link colour, cursor size, cursor colour, cursor trails, invert colour, invert images, tracing, magnification, personal stylesheet, application, extension], unordered
Description	Collection of AfA needs and preferences for how to configure enhancements to a screen **display**.

6.5.1 'Usage' Attribute Description

Table 6.26 Description of the 'usage' attribute for the Screen_Enhancement class.

Descriptor	Definition
Attribute name	usage
Data type	Enumerated vocabulary: Usage_Vocabulary
Value space	The enumerated vocabulary is: {required | preferred | optionally use | prohibited }. Default=preferred.
Multiplicity	[0..1]
Description	Rating for the collection of AfA needs and preferences. The value space for this vocabulary is approved by IMS GLC. The syntax and semantics of the approved list of terms shall be supported by all software components implementing this Information Model. The value space for the vocabulary may be extended. Such extensions may be created and used only when no approved IMS GLC value satisfies the expressive need of an implementing community to define the shape of a collection.

6.5.2 'Font Face' Attribute Description

Table 6.27 Description of the 'font face' attribute for the Screen_Enhancement class.

Descriptor	Definition
Attribute name	Font face
Data type	Font Face
Value space	Container
Multiplicity	[0..1]
Description	Collection of data elements that states an AfA preference for a font.

6.5.3 'Font Size' Attribute Description

Table 6.28 Description of the 'font size' attribute for the Screen_Enhancement class.

Descriptor	Definition
Attribute name	font size
Data type	Decimal
Value space	Real (10, 4). Font size ≥ 0.0. Default=12.0.
Multiplicity	[0..1]
Description	Size of a font. NOTE: This value is in points.

6.5.4 'Foreground Colour' Attribute Description

Table 6.29 Description of the 'foreground colour' attribute for the Screen_Enhancement class.

Descriptor	Definition
Attribute name	foreground colour
Data type	Enumerated vocabulary: Colour_Vocabulary
Value space	The enumerated vocabulary is: { red | green | blue | alpha }. Default=O/S setting.
Multiplicity	[0..1]
Description	Foreground colour in an interface that is displaying text. The value space for this vocabulary is approved by IMS GLC. The syntax and semantics of the approved list of terms shall be supported by all software components implementing this Information Model.

Descriptor	Definition
	The value space for the vocabulary may be extended. Such extensions may be created and used only when no approved IMS GLC value satisfies the expressive need of an implementing community to define the shape of a collection.

6.5.5 'Background Colour' Attribute Description

Table 6.30 Description of the 'background colour' attribute for the Screen_Enhancement class.

Descriptor	Definition
Attribute name	background colour
Data type	Enumerated vocabulary: Colour_Vocabulary
Value space	The enumerated vocabulary is: { red | green | blue | alpha }. Default=O/S setting.
Multiplicity	[0..1]
Description	Background colour in an interface that is displaying text. The value space for this vocabulary is approved by IMS GLC. The syntax and semantics of the approved list of terms shall be supported by all software components implementing this Information Model. The value space for the vocabulary may be extended. Such extensions may be created and used only when no approved IMS GLC value satisfies the expressive need of an implementing community to define the shape of a collection.

6.5.6 'Highlight Colour' Attribute Description

Table 6.31 Description of the 'Highlight colour' attribute for the Screen_Enhancement class.

Descriptor	Definition
Attribute name	Highlight colour
Data type	Enumerated vocabulary: Colour_Vocabulary
Value space	The enumerated vocabulary is: { red | green | blue | alpha }. Default=O/S setting.
Multiplicity	[0..1]
Description	The highlight colour in an interface that is displaying text. The value space for this vocabulary is approved by IMS GLC. The syntax and semantics of the approved list of terms shall be supported by all software components implementing this Information Model. The value space for the vocabulary may be extended. Such extensions may be created and used only when no approved IMS GLC value satisfies the expressive need of an implementing community to define the shape of a collection.

6.5.7 'Link Colour' Attribute Description

Table 6.32 Description of the 'link colour' attribute for the Screen_Enhancement class.

Descriptor	Definition
Attribute name	link colour
Data type	Enumerated vocabulary: Colour_Vocabulary
Value space	The enumerated vocabulary is: {red | green | blue | alpha }. Default=O/S setting.
Multiplicity	[0..1]
Description	Link colour in an interface that is displaying text with hyperlinks. The value space for this vocabulary is approved by IMS GLC. The syntax and semantics of the approved list of terms shall be supported by all software components implementing this Information Model. The value space for the vocabulary may be extended. Such extensions may be created and used only when no approved IMS GLC value satisfies the expressive need of an implementing community to define the shape of a collection.

6.5.8 'Cursor Size' Attribute Description

Table 6.33 Description of the 'cursor size' attribute for the Screen_Enhancement class.

Descriptor	Definition
Attribute name	cursor size
Data type	Decimal
Value space	Real (10, 4). $0.0 \leq$ cursor size ≤ 1.0. Default=0.5.
Multiplicity	[0..1]
Description	Size of a cursor. NOTE Use 0.0 = "standard", 0.5 = "large", 1.0 = "extra large".

6.5.9 'Cursor Colour' Attribute Description

Table 6.34 Description of the 'cursor colour' attribute for the Screen_Enhancement class.

Descriptor	Definition
Attribute name	cursor colour
Data type	Enumerated vocabulary: Colour_Vocabulary
Value space	The enumerated vocabulary is: { red | green | blue | alpha }. Default=O/S setting.
Multiplicity	[0..1]
Description	Colour of a cursor. The value space for this vocabulary is approved by IMS GLC. The syntax and semantics of the approved list of terms shall be supported by all software components implementing this Information Model. The value space for the vocabulary may be extended. Such extensions may be created and used only when no approved IMS GLC value satisfies the expressive need of an implementing community to define the shape of a collection.

6.5.10 'Cursor Trails' Attribute Description

Table 6.35 Description of the 'cursor trails' attribute for the Screen_Enhancement class.

Descriptor	Definition
Attribute name	cursor trails
Data type	Decimal
Value space	Real (10, 4). $0.0 \leq$ cursor trails ≤ 1.0. Default=0.5.
Multiplicity	[0..1]
Description	Length of cursor *trail*. NOTE Use 0.0 = "no trail", 0.5 = "medium", 1.0 = "longest".

6.5.11 'Invert Colour Choice' Attribute Description

Table 6.36 Description of the 'invert colour choice' attribute for the Screen_Enhancement class.

Descriptor	Definition
Attribute name	invert colour choice
Data type	Boolean
Value space	Enumerated value: { true | false }. Default=false.
Multiplicity	[0..1]
Description	AfA preference to invert the foreground and background colours.

6.5.12 'Invert Images' Attribute Description

Table 6.37 Description of the 'invert images' attribute for the Screen_Enhancement class.

Descriptor	Definition
Attribute name	invert images
Data type	Boolean
Value space	Enumerated value: { true | false }. Default=false.
Multiplicity	[0..1]
Description	AfA preference to invert the colours of images.

6.5.13 'Tracking' Attribute Description

Table 6.38 Description of the 'tracking' attribute for the Screen_Enhancement class.

Descriptor	Definition
Attribute name	tracking
Data type	Enumerated vocabulary: Tracking_Vocabulary
Value space	The enumerated vocabulary is: { mouse | caret | focus }.
Multiplicity	[0..unbounded], unordered
Description	User interface elements to track. NOTE 1: When using screen magnification, the entire screen is not visible. This preference will direct the magnifier to an area of the screen to display (e.g. the area around the "mouse", the cursor, or the point of focus). NOTE 2: As it is common for users to alter this setting as they work, this preference is intended to be a default. The value space for this vocabulary is approved by IMS GLC. The syntax and semantics of the approved list of terms shall be supported by all software components implementing this Information Model. The value space for the vocabulary may be extended. Such extensions may be created and used only when no approved IMS GLC value satisfies the expressive need of an implementing community to define the shape of a collection.

6.5.14 'Magnification' Attribute Description

Table 6.39 Description of the 'magnification' attribute for the Screen_Enhancement class.

Descriptor	Definition
Attribute name	magnification
Data type	Decimal
Value space	Real (10, 4). 1.0 ≤ cursor size. Default=1.0.
Multiplicity	[0..1]
Description	Preferred magnification of the screen as a factor of a screen's original size. NOTE: A value of 1.0 means the original magnification size.

6.5.15 'Personal Stylesheet' Attribute Description

Table 6.40 Description of the 'personal stylesheet' attribute for the Screen_Enhancement class.

Descriptor	Definition
Attribute name	Personal stylesheet
Data type	URI
Value space	See Table 6.1.
Multiplicity	[0..1]
Description	A data element identifying a style sheet.

6.5.16 'Application' Attribute Description

Table 6.41 Description of the 'application' attribute for the Screen_Enhancement class.

Descriptor	Definition
Attribute name	application
Data type	Application
Value space	Container
Multiplicity	[0..unbounded], unordered
Description	Collection of AfA needs and preferences for how to configure vendor-specific **application parameters** of **assistive technology**.

6.5.17 'Extension' Attribute Description

Table 6.42 Description of the 'extension' attribute for the Screen_Enhancement class.

Descriptor	Definition
Attribute name	extension
Data type	Unspecified
Value space	Defined in terms of how the Information Model is realized by a binding.
Multiplicity	[0..unbounded], unordered
Description	This is a placeholder. It informs bindings of this Information Model as to the valid locations for the inclusion that extend the parent class.

6.6 Text_Reading_Highlight Class Description

The PIM for the Text_Reading_Highlight data model is shown in Figure 6.5.

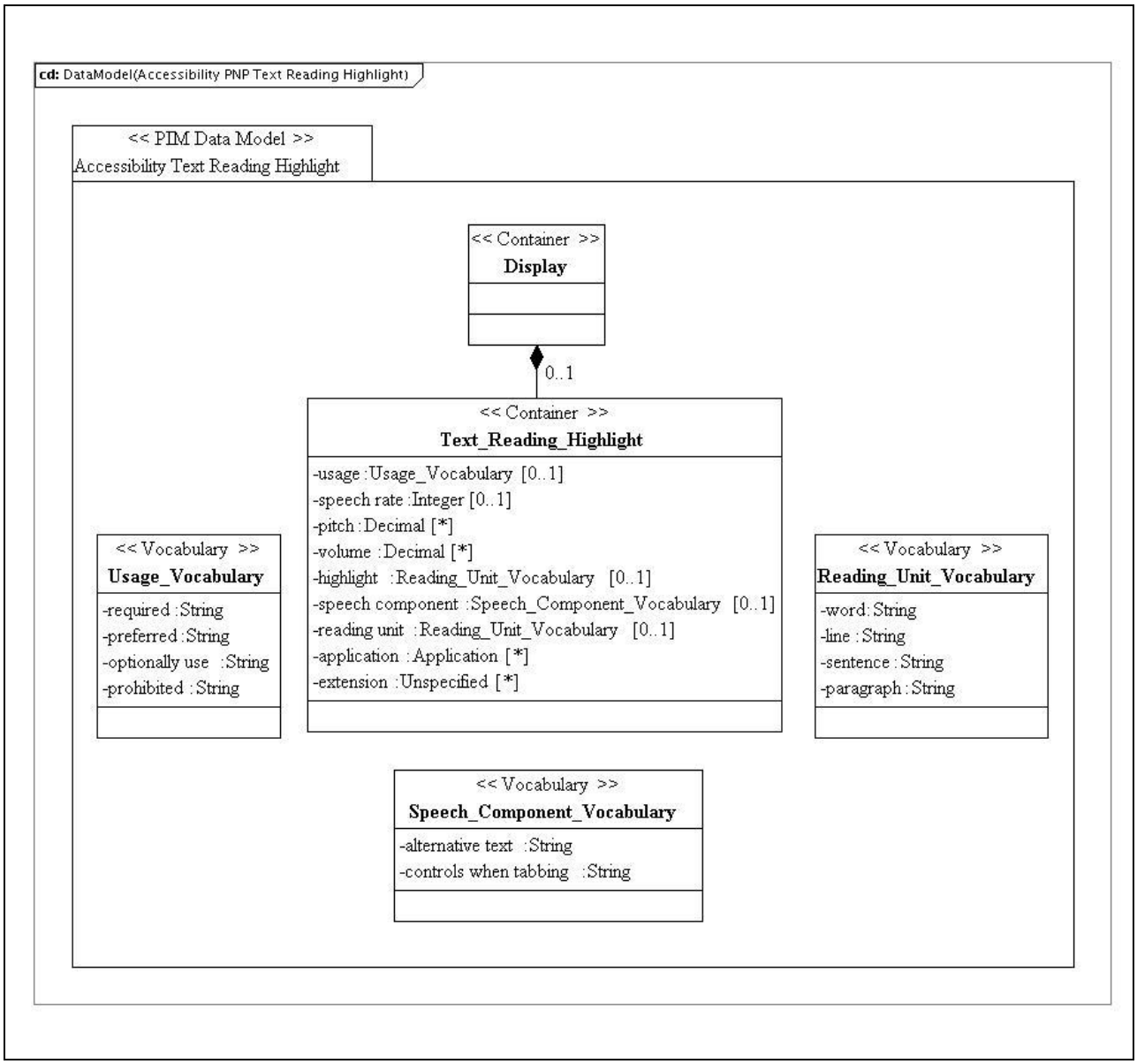


Figure 6.5 — Text_Reading_Highlight class diagram.

Table 6.43 Description of the 'Text_Reading_Highlight' class.

Descriptor	Definition
Class name	Text_Reading_Highlight
Class type	Container
Parents	Display
Children	[usage, speech rate, pitch, volume, highlight, speech component, reading unit, application, extension], unordered
Description	Collection of AfA needs and preferences for how to configure a *text reading and highlighting* system.

6.6.1 'Usage' Attribute Description

Table 6.44 Description of the 'usage' attribute for the Text_Reading_Highlight class.

Descriptor	Definition
Attribute name	usage
Data type	Enumerated vocabulary: Usage_Vocabulary
Value space	The enumerated vocabulary is: {required | preferred | optionally use | prohibited }. Default=preferred.
Multiplicity	[0..1]
Description	Rating for the collection of AfA needs and preferences. The value space for this vocabulary is approved by IMS GLC. The syntax and semantics of the approved list of terms shall be supported by all software components implementing this Information Model. The value space for the vocabulary may be extended. Such extensions may be created and used only when no approved IMS GLC value satisfies the expressive need of an implementing community to define the shape of a collection.

6.6.2 'Speech Rate' Attribute Description

Table 6.45 Description of the 'speech rate' attribute for the Text_Reading_Highlight class.

Descriptor	Definition
Attribute name	speech rate
Data type	Integer
Value space	≥ 1 (words per minute). Default=180.
Multiplicity	[0..1]
Description	Rate of speech of a *speech synthesizer*. Note: A *speech synthesizer* may be used by or with a number of technologies, including a *screen reader*, *text reader/highlighter* or *Braille display*, among others.

6.6.3 'Pitch' Attribute Description

Table 6.46 Description of the 'pitch' attribute for the Text_Reading_Highlight class.

Descriptor	Definition
Attribute name	pitch
Data type	Decimal (10,4)
Value space	0.0 ≤ pitch ≤ 1.0. Default=0.5.
Multiplicity	[0..unbounded], unordered
Description	Pitch of a *speech synthesizer*. NOTE 1: A *speech synthesizer* may be used by or with a number of technologies, including a *screen reader*, *text reader/highlighter* or *Braille display*, among others. NOTE 2: Use 0.0 = "low", 0.5 = "medium", 1.0 = "high".

6.6.4 'Volume' Attribute Description

Table 6.47 Description of the 'volume' attribute for the Text_Reading_Highlight class.

Descriptor	Definition
Attribute name	volume
Data type	Decimal (10,4)
Value space	0.0 ≤ volume ≤ 1.0. Default=0.5.
Multiplicity	[0..unbounded], unordered
Description	Volume of a *speech synthesizer*. NOTE 1: A *speech synthesizer* may be used by or with a number of technologies, including a *screen reader*, *text reader/highlighter* or *Braille display*, among others. NOTE 2: Use 0.0 = "low", 0.5 = "medium", 1.0 = "high".

6.6.5 'Highlight' Attribute Description

Table 6.48 Description of the 'highlight' attribute for the Text_Reading_Highlight class.

Descriptor	Definition
Attribute name	highlight
Data type	Enumerated vocabulary: Reading_Unit_Vocabulary
Value space	The enumerated vocabulary is: { word | line | sentence | paragraph }. Default=word.
Multiplicity	[0..1]
Description	Unit of reading to be spoken. The value space for this vocabulary is approved by IMS GLC. The syntax and semantics of the approved list of terms shall be supported by all software components implementing this Information Model. The value space for the vocabulary may be extended. Such extensions may be created and used only when no approved IMS GLC value satisfies the expressive need of an implementing community to define the shape of a collection.

6.6.6 'Speech Component' Attribute Description

Table 6.49 Description of the 'speech component' attribute for the Text_Reading_Highlight class.

Descriptor	Definition
Attribute name	speech component
Data type	Enumerated vocabulary: Speech_Component_Vocabulary
Value space	The enumerated vocabulary is: { alternative | controls when tabbing }.
Multiplicity	[0..1]
Description	What components of the user interface should be spoken. NOTE: *Text readers/highlighters* can speak user interface components (in addition to the text of a document) such as alternate text describing an image, or user interface controls. The value space for this vocabulary is approved by IMS GLC. The syntax and semantics of the approved list of terms shall be supported by all software components implementing this Information Model. The value space for the vocabulary may be extended. Such extensions may be created and used only when no approved IMS GLC value satisfies the expressive need of an implementing community to define the shape of a collection.

6.6.7 'Reading Unit' Attribute Description

Table 6.50 Description of the 'reading unit' attribute for the Text_Reading_Highlight class.

Descriptor	Definition
Attribute name	reading unit
Data type	Enumerated vocabulary: Reading_Unit_Vocabulary
Value space	The enumerated vocabulary is: { word | line | sentence | paragraph }. Default=word.
Multiplicity	[0..1]
Description	Unit of reading to be spoken. The value space for this vocabulary is approved by IMS GLC. The syntax and semantics of the approved list of terms shall be supported by all software components implementing this Information Model. The value space for the vocabulary may be extended. Such extensions may be created and used only when no approved IMS GLC value satisfies the expressive need of an implementing community to define the shape of a collection.

6.6.8 'Application' Attribute Description

Table 6.51 Description of the 'application' attribute for the Text_Reading_Highlight class.

Descriptor	Definition
Attribute name	application
Data type	Application
Value space	Container
Multiplicity	[0..unbounded], unordered
Description	Collection of needs and preferences for how to configure vendor-specific parameters of an **assistive technology.**

6.6.9 'Extension' Attribute Description

Table 6.52 Description of the 'extension' attribute for the Text_Reading_Highlight class.

Descriptor	Definition
Attribute name	extension
Data type	Unspecified
Value space	Defined in terms of how the Information Model is realized by a binding.
Multiplicity	[0..unbounded], unordered
Description	This is a placeholder. It informs bindings of this Information Model as to the valid locations for the inclusion that extend the parent class.

6.7 Braille Class Description

The PIM for the Braille data model is shown in Figure 6.6.

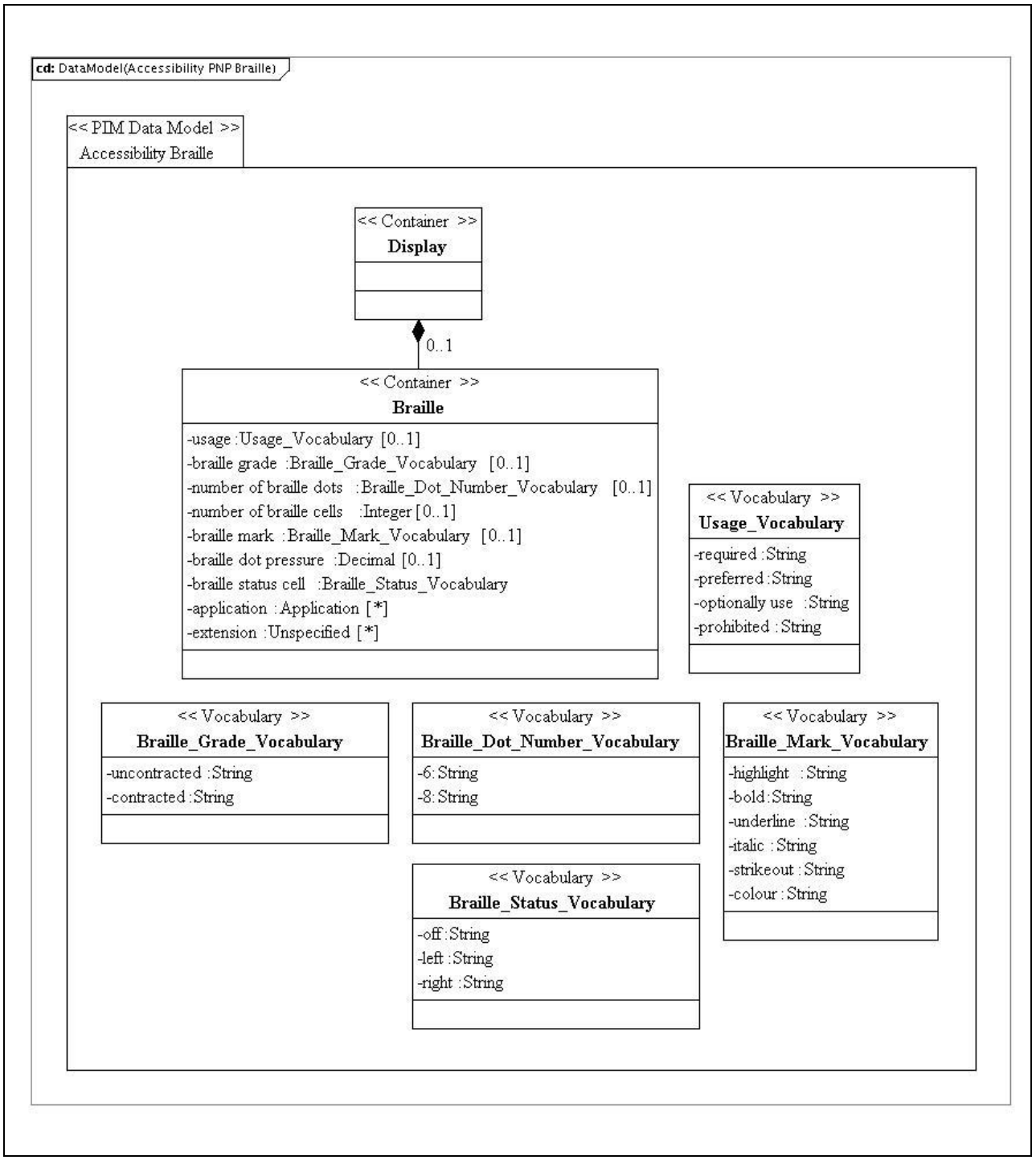


Figure 6.6 — Braille class diagram.

Table 6.53 Description of the 'Braille' class.

Descriptor	Definition
Class name	Braille
Class type	Container
Parents	Display
Children	[usage, braille grade, number of braille dots, number of braille cells, braille mark, braille dot pressure, braille status cell, application, extension], unordered
Description	Collection of needs and preferences for how to configure a *Braille display*.

6.7.1 'Usage' Attribute Description

Table 6.54 Description of the 'usage' attribute for the Braille class.

Descriptor	Definition
Attribute name	usage
Data type	Enumerated vocabulary: Usage_Vocabulary
Value space	The enumerated vocabulary is: {required | preferred | optionally use | prohibited }. Default=preferred.
Multiplicity	[0..1]
Description	Rating for the collection of AfA needs and preferences. The value space for this vocabulary is approved by IMS GLC. The syntax and semantics of the approved list of terms shall be supported by all software components implementing this Information Model. The value space for the vocabulary may be extended. Such extensions may be created and used only when no approved IMS GLC value satisfies the expressive need of an implementing community to define the shape of a collection.

6.7.2 'Braille Grade' Attribute Description

Table 6.55 Description of the 'braille grade' attribute for the Braille class.

Descriptor	Definition
Attribute name	braille grade
Data type	Enumerated vocabulary: Braille_Grade_Vocabulary
Value space	The enumerated vocabulary is: { uncontracted | contracted }. Default=uncontracted.
Multiplicity	[0..1]
Description	Grade of Braille to use when using a Braille display. NOTE: Grade 1 corresponds to "uncontracted" Braille, and Grade 2 corresponds to "contracted" Braille. Grade 2 supports contractions and other possible extensions. The value space for this vocabulary is approved by IMS GLC. The syntax and semantics of the approved list of terms shall be supported by all software components implementing this Information Model. The value space for the vocabulary may be extended. Such extensions may be created and used only when no approved IMS GLC value satisfies the expressive need of an implementing community to define the shape of a collection.

6.7.3 'Number of Braille Dots' Attribute Description

Table 6.56 Description of the 'number of braille dots' attribute for the Braille class.

Descriptor	Definition
Attribute name	number of braille dots
Data type	Enumerated vocabulary: Braille_Dot_Number_Vocabulary
Value space	The enumerated vocabulary is: { 6 | 8 }. Default=6.
Multiplicity	[0..1]
Description	Number of dots in a *Braille cell*. The value space for this vocabulary is approved by IMS GLC. The syntax and semantics of the approved list of terms shall be supported by all software components implementing this Information Model. The value space for the vocabulary may be extended. Such extensions may be created and used only when no approved IMS GLC value satisfies the expressive need of an implementing community to define the shape of a collection.

6.7.4 'Number of Braille Cells' Attribute Description

Table 6.57 Description of the 'number of braille cells' attribute for the Braille class.

Descriptor	Definition
Attribute name	number of braille cells
Data type	Integer
Value space	≥1. Default=80.
Multiplicity	[0..1]
Description	Number of active Braille cells in a Braille display.

6.7.5 'Braille Mark' Attribute Description

Table 6.58 Description of the 'braille mark' attribute for the Braille class.

Descriptor	Definition
Attribute name	braille mark
Data type	Enumerated vocabulary: Braille_Mark_Vocabulary
Value space	The enumerated vocabulary is: { highlight | bold | underline | italic | strikeout | colour }.
Multiplicity	[0..1]
Description	What textual properties to mark when using a *Braille display*. The value space for this vocabulary is approved by IMS GLC. The syntax and semantics of the approved list of terms shall be supported by all software components implementing this Information Model. The value space for the vocabulary may be extended. Such extensions may be created and used only when no approved IMS GLC value satisfies the expressive need of an implementing community to define the shape of a collection.

6.7.6 'Braille Dot Pressure' Attribute Description

Table 6.59 Description of the 'braille dot pressure' attribute for the Braille class.

Descriptor	Definition
Attribute name	braille dot pressure
Data type	Decimal (10,4).
Value space	0.0 ≤ braille dot pressure ≤ 1.0. Default=0.5.
Multiplicity	[0..1]
Description	Resistance pressure of *Braille display* pins. NOTE Use 0.0 = "low", 0.5 = "medium", 1.0 = "high".

6.7.7 'Braille Status Cell' Attribute Description

Table 6.60 Description of the 'braille status cell' attribute for the Braille class.

Descriptor	Definition
Attribute name	braille status cell
Data type	Enumerated vocabulary: Braille_Status_Vocabulary
Value space	The enumerated vocabulary is: { off | left | right }. Default=off.
Multiplicity	[1]
Description	The presence or location of a *Braille display* status cell. The value space for this vocabulary is approved by IMS GLC. The syntax and semantics of the approved list of terms shall be supported by all software components implementing this Information Model. The value space for the vocabulary may be extended. Such extensions may be created and used only when no approved IMS GLC value satisfies the expressive need of an implementing community to define the shape of a collection.

6.7.8 'Application' Attribute Description

Table 6.61 Description of the 'application' attribute for the Braille class.

Descriptor	Definition
Attribute name	application
Data type	Application
Value space	Container
Multiplicity	[0..unbounded], unordered
Description	Collection of needs and preferences for how to configure vendor-specific parameters of an **assistive technology.**

6.7.9 'Extension' Attribute Description

Table 6.62 Description of the 'extension' attribute for the Braille class.

Descriptor	Definition
Attribute name	extension
Data type	Unspecified
Value space	Defined in terms of how the Information Model is realized by a binding.
Multiplicity	[0..unbounded], unordered
Description	This is a placeholder. It informs bindings of this Information Model as to the valid locations for the inclusion that extend the parent class.

6.8 Tactile Class Description

The PIM for the Tactile data model is shown in Figure 6.7.

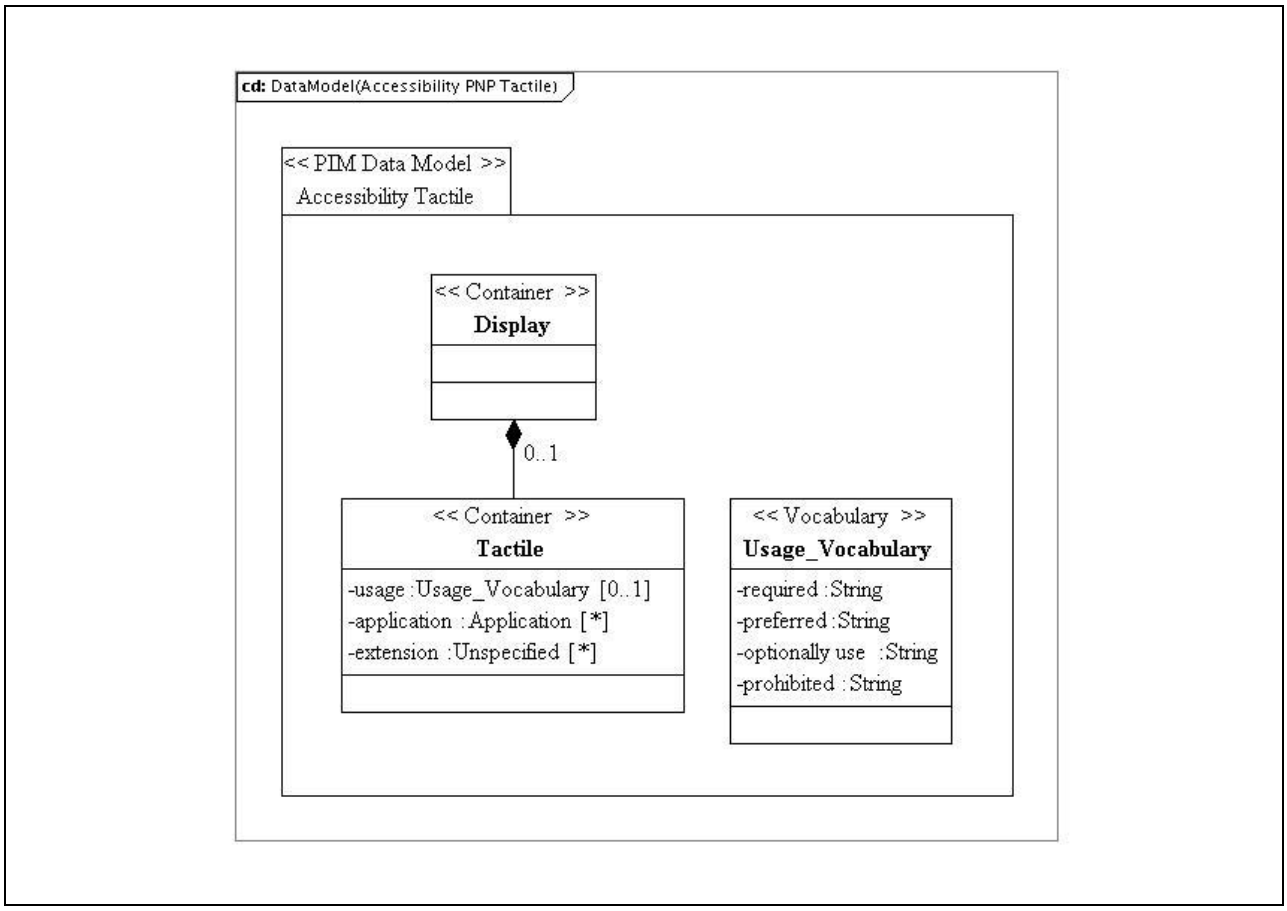


Figure 6.7 — Tactile class diagram.

Table 6.63 Description of the 'Tactile' class.

Descriptor	Definition
Class name	tactile
Class type	Container
Parents	Display
Children	[usage, application, extension], unordered
Description	Collection of needs and preferences for how to configure a *tactile display.* NOTE Intended for future use.

6.8.1 'Usage' Attribute Description

Table 6.64 Description of the 'usage' attribute for the Tactile class.

Descriptor	Definition
Attribute name	usage
Data type	Enumerated vocabulary: Usage_Vocabulary
Value space	The enumerated vocabulary is: {required | preferred | optionally use | prohibited }. Default=preferred.
Multiplicity	[0..1]
Description	Rating for the collection of AfA needs and preferences. The value space for this vocabulary is approved by IMS GLC. The syntax and semantics of the approved list of terms shall be supported by all software components implementing this Information Model. The value space for the vocabulary may be extended. Such extensions may be created and used only when no approved IMS GLC value satisfies the expressive need of an implementing community to define the shape of a collection.

6.8.2 'Application' Attribute Description

Table 6.65 Description of the 'application' attribute for the Tactile class.

Descriptor	Definition
Attribute name	application
Data type	Application
Value space	Container
Multiplicity	[0..unbounded], unordered
Description	Collection of needs and preferences for how to configure vendor-specific parameters of an **assistive technology.**

6.8.3 'Extension' Attribute Description

Table 6.66 Description of the 'extension' attribute for the Tactile class.

Descriptor	Definition
Attribute name	extension
Data type	Unspecified
Value space	Defined in terms of how the Information Model is realized by a binding.
Multiplicity	[0..unbounded], unordered
Description	This is a placeholder. It informs bindings of this Information Model as to the valid locations for the inclusion that extend the parent class.

6.9 Visual Alert Class Description

The PIM for the Visual Alert data model is shown in Figure 6.8.

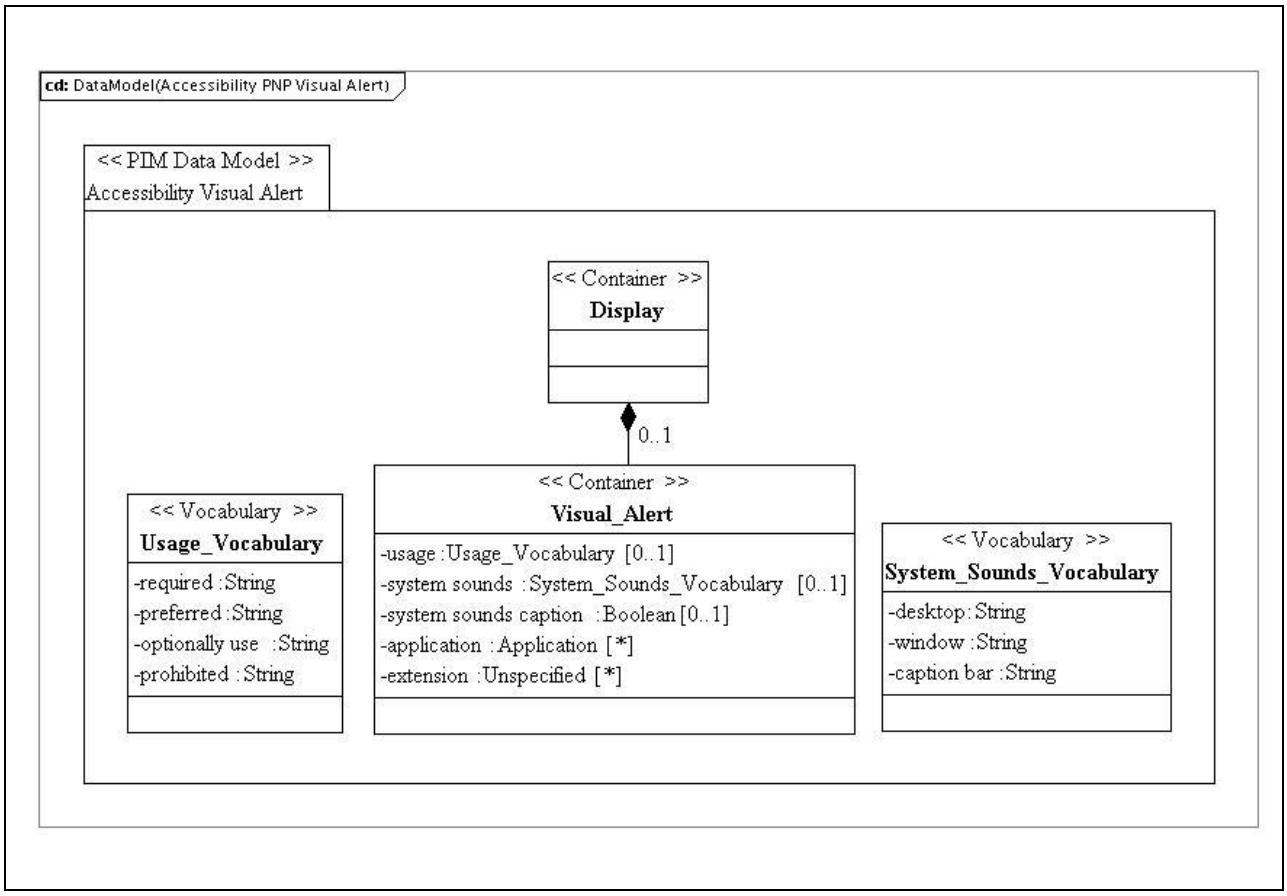


Figure 6.8 — Visual_Alert class diagram.

Table 6.67 Description of the 'Visual_Alert' class.

Descriptor	Definition
Class name	Visual_Alert
Class type	Container
Parents	Display
Children	[usage, system sounds, system sounds caption, application, extension], unordered
Description	Collection of needs and preferences for how to configure *visual alerts*.

6.9.1 'Usage' Attribute Description

Table 6.68 Description of the 'usage' attribute for the Visual_Alert class.

Descriptor	Definition
Attribute name	usage
Data type	Enumerated vocabulary: Usage_Vocabulary
Value space	The enumerated vocabulary is: {required | preferred | optionally use | prohibited }. Default=preferred.
Multiplicity	[0..1]
Description	Rating for the collection of AfA needs and preferences. The value space for this vocabulary is approved by IMS GLC. The syntax and semantics of the approved list of terms shall be supported by all software components implementing this Information Model. The value space for the vocabulary may be extended. Such extensions may be created and used only when no approved IMS GLC value satisfies the expressive need of an implementing community to define the shape of a collection.

6.9.2 'System Sounds' Attribute Description

Table 6.69 Description of the 'system sounds' attribute for the Visual Alert class.

Descriptor	Definition
Attribute name	system sounds
Data type	Enumerated vocabulary: System_Sounds_Vocabulary
Value space	The enumerated vocabulary is: { desktop | window | caption }.
Multiplicity	[0..1]
Description	What to use as a visual alternative to system alert sounds. NOTE: This is usually achieved by flashing the desktop, the active window, or the caption bar. The value space for this vocabulary is approved by IMS GLC. The syntax and semantics of the approved list of terms shall be supported by all software components implementing this Information Model. The value space for the vocabulary may be extended. Such extensions may be created and used only when no approved IMS GLC value satisfies the expressive need of an implementing community to define the shape of a collection.

6.9.3 'System Sounds Caption' Attribute Description

Table 6.70 Description of the 'system sounds caption' attribute for the Visual Alert class.

Descriptor	Definition
Attribute name	system sounds caption
Data type	Boolean
Value space	Enumerated: { true | false }. Default=false.
Multiplicity	[0..1]
Description	Preference to use a textual message for any system-generated audio.

6.9.4 'Application' Attribute Description

Table 6.71 Description of the 'application' attribute for the Visual Alert class.

Descriptor	Definition
Attribute name	application
Data type	Application
Value space	Container
Multiplicity	[0..unbounded], unordered
Description	Collection of needs and preferences for how to configure vendor-specific parameters of an **assistive technology.**

6.9.5 'Extension' Attribute Description

Table 6.72 Description of the 'extension' attribute for the Visual Alert class.

Descriptor	Definition
Attribute name	extension
Data type	Unspecified
Value space	Defined in terms of how the Information Model is realized by a binding.
Multiplicity	[0..unbounded], unordered
Description	This is a placeholder. It informs bindings of this Information Model as to the valid locations for the inclusion that extend the parent class.

6.10 Structural_Presentation Class Description

The PIM for the Structural_Presentation data model is shown in Figure 6.9.

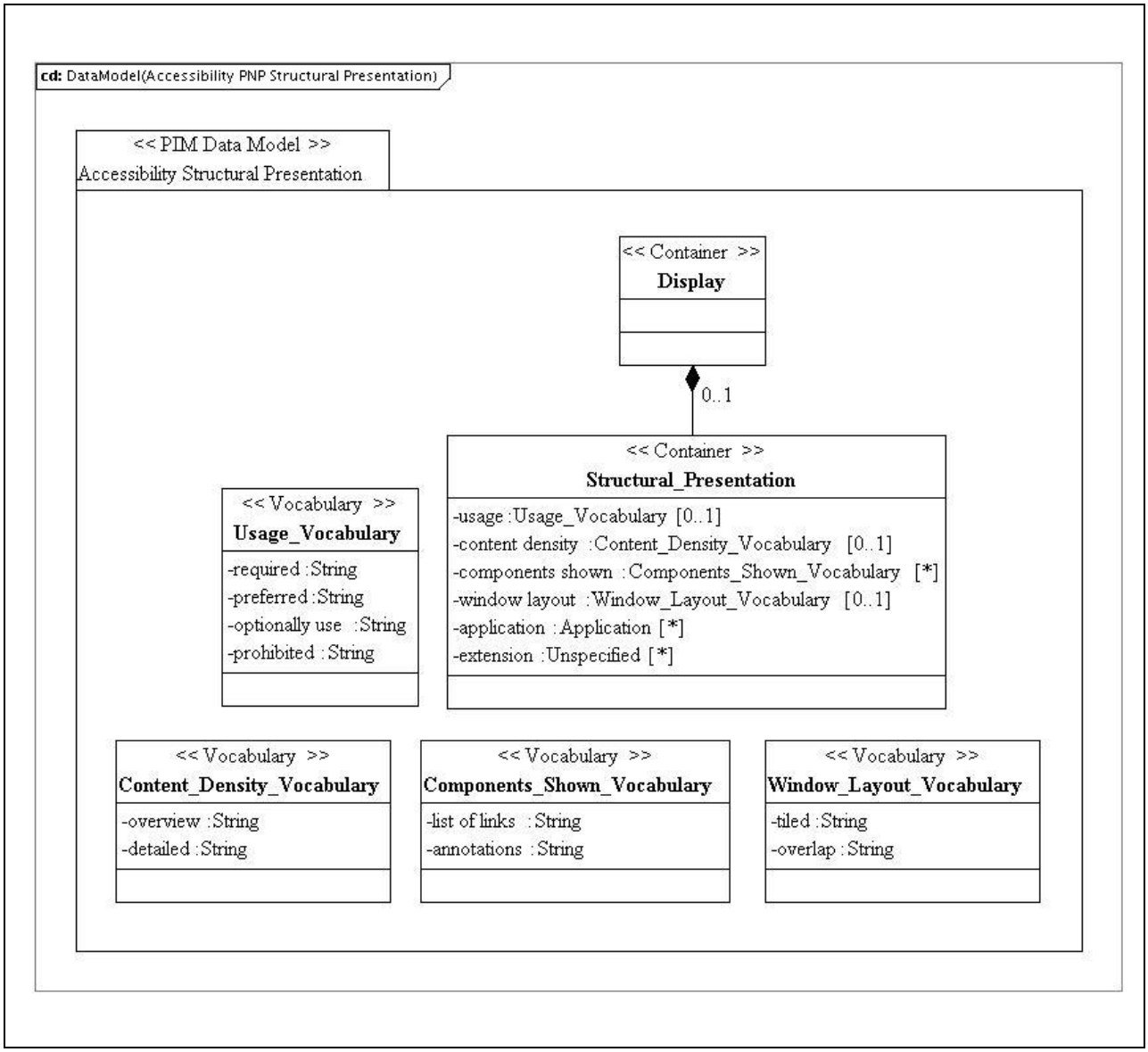


Figure 6.9 — Structural_Presentation class diagram.

Table 6.73 Description of the 'Structural_Presentation' class.

Descriptor	Definition
Class name	Stuctural_Presentation
Class type	Container
Parents	Display
Children	[usage, context density, components shown, window layout, application, extension] unordered
Description	Collection of needs and preferences for how the structure of content should be displayed.

6.10.1 'Usage' Attribute Description

Table 6.74 Description of the 'usage' attribute for the Structural_Presentation class.

Descriptor	Definition
Attribute name	usage
Data type	Enumerated vocabulary: Usage_Vocabulary
Value space	The enumerated vocabulary is: {required | preferred | optionally use | prohibited }. Default=preferred.
Multiplicity	[0..1]
Description	Rating for the collection of AfA needs and preferences. The value space for this vocabulary is approved by IMS GLC. The syntax and semantics of the approved list of terms shall be supported by all software components implementing this Information Model. The value space for the vocabulary may be extended. Such extensions may be created and used only when no approved IMS GLC value satisfies the expressive need of an implementing community to define the shape of a collection.

6.10.2 'Content Density' Attribute Description

Table 6.75 Description of the 'content density' attribute for the Structural_Presentation class.

Descriptor	Definition
Attribute name	content density
Data type	Enumerated vocabulary: Content_Density_Vocabulary
Value space	The enumerated vocabulary is: { overview | detailed }. Default=overview.
Multiplicity	[0..1]
Description	Amount of detail to provide at any given time. NOTE This is intended to support automatic transformation by a system or application. The value space for this vocabulary is approved by IMS GLC. The syntax and semantics of the approved list of terms shall be supported by all software components implementing this Information Model. The value space for the vocabulary may be extended. Such extensions may be created and used only when no approved IMS GLC value satisfies the expressive need of an implementing community to define the shape of a collection.

6.10.3 'Components Shown' Attribute Description

Table 6.76 Description of the 'components shown' attribute for Structural_Presentation class.

Descriptor	Definition
Attribute name	components shown
Data type	Enumerated vocabulary: Components_Shown_Vocabulary
Value space	The enumerated vocabulary is: { list of links | annotations }. Default=annotations.
Multiplicity	[0..unbounded], unordered
Description	Which components of a user interface to display. The value space for this vocabulary is approved by IMS GLC. The syntax and semantics of the approved list of terms shall be supported by all software components implementing this Information Model. The value space for the vocabulary may be extended. Such extensions may be created and used only when no approved IMS GLC value satisfies the expressive need of an implementing community to define the shape of a collection.

6.10.4 'Window Layout' Attribute Description

Table 6.77 Description of the 'window layout' attribute for the Structural_Presentation class.

Descriptor	Definition
Attribute name	window layout
Data type	Enumerated vocabulary: Window_Layout_Vocabulary
Value space	The enumerated vocabulary is: { tiled | overlap }. Default=tiled.
Multiplicity	[0..1]
Description	Spatial arrangement of application windows displayed on a screen. The value space for this vocabulary is approved by IMS GLC. The syntax and semantics of the approved list of terms shall be supported by all software components implementing this Information Model. The value space for the vocabulary may be extended. Such extensions may be created and used only when no approved IMS GLC value satisfies the expressive need of an implementing community to define the shape of a collection.

6.10.5 'Application' Attribute Description

Table 6.78 Description of the 'application' attribute for the Structural_Presentation class.

Descriptor	Definition
Attribute name	application
Data type	Application
Value space	Container
Multiplicity	[0..unbounded], unordered
Description	Collection of needs and preferences for how to configure vendor-specific parameters of an **assistive technology.**

6.10.6 'Extension' Attribute Description

Table 6.79 Description of the 'extension' attribute for the Structural_Presentation class.

Descriptor	Definition
Attribute name	extension
Data type	Unspecified
Value space	Defined in terms of how the Information Model is realized by a binding.
Multiplicity	[0..unbounded], unordered
Description	This is a placeholder. It informs bindings of this Information Model as to the valid locations for the inclusion that extend the parent class.

6.11 Font_Face Class Description

The PIM for the Font Face data model is shown in Figure 6.10.

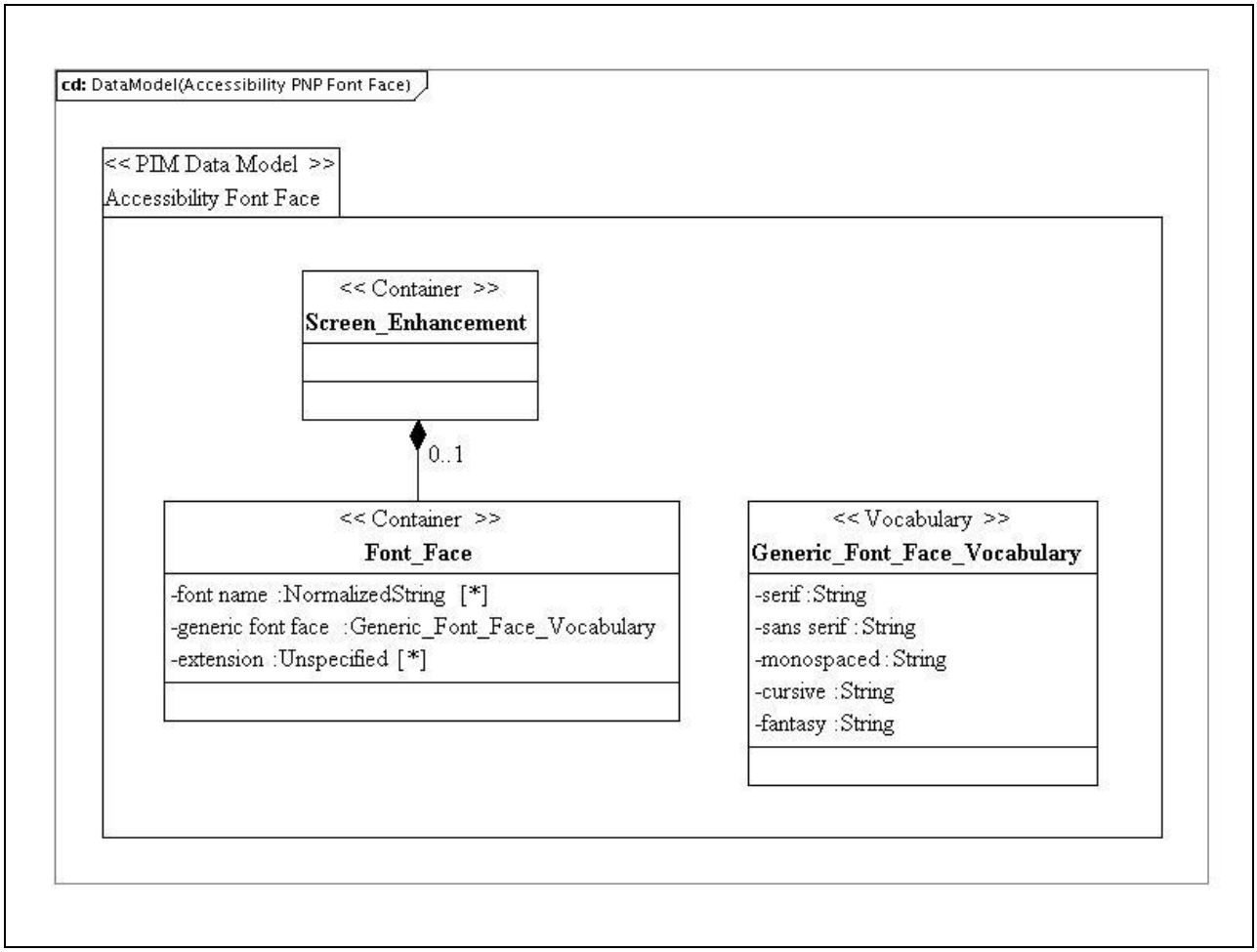


Figure 6.10 — Font_Face class diagram.

Table 6.80 Description of the 'Font_Face' class.

Descriptor	Definition
Class name	Font_Face
Class type	Container
Parents	Screen_Enhancement
Children	[font name, generic font face, extension], unordered
Description	Collection of data elements that states an AfA preference for a font.

6.11.1 'Font Name' Attribute Description

Table 6.81 Description of the 'font name' attribute for the Font_Face class.

Descriptor	Definition
Attribute name	font name
Data type	Normalized String.
Value space	See Table 6.1.
Multiplicity	[0..unbounded], unordered
Description	Font by name.

6.11.2 'Generic Font Face' Attribute Description

Table 6.82 Description of the 'generic font face' attribute for the Font_Face class.

Descriptor	Definition
Attribute name	Generic font face
Data type	Enumerated vocabulary: Generic_Font_Face_Vocabulary
Value space	The enumerated vocabulary is: { serif | sans serif | monospaced | cursive | fantasy }. Default= sans serif.
Multiplicity	1
Description	Name of a generic font. The value space for this vocabulary is approved by IMS GLC. The syntax and semantics of the approved list of terms shall be supported by all software components implementing this Information Model. The value space for the vocabulary may be extended. Such extensions may be created and used only when no approved IMS GLC value satisfies the expressive need of an implementing community to define the shape of a collection.

6.11.3 'Extension' Attribute Description

Table 6.83 Description of the 'extension' attribute for the Font_Face class.

Descriptor	Definition
Attribute name	extension
Data type	Unspecified
Value space	Defined in terms of how the Information Model is realized by a binding.
Multiplicity	[0..unbounded], unordered
Description	This is a placeholder. It informs bindings of this Information Model as to the valid locations for the inclusion that extend the parent class.

6.12 Control Class Description

The PIM for the Control data model is shown in Figure 6.11.

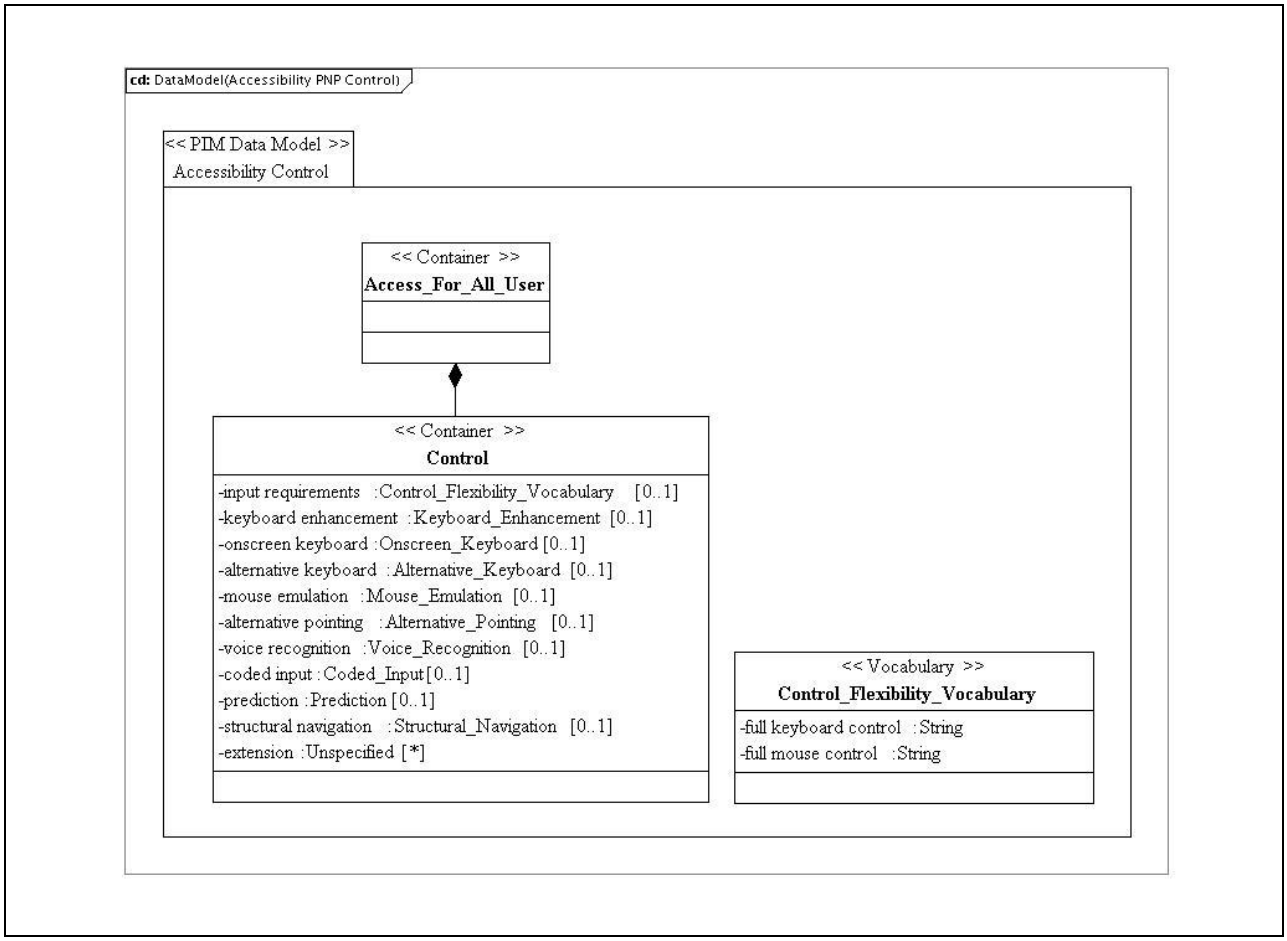


Figure 6.11 — Control class diagram.

Table 6.84 Description of the 'Control' class.

Descriptor	Definition
Class name	Control
Class type	Container
Parents	Access_For_All_User
Children	[input requirements, keyboard enhancement, onscreen keyboard, alternative keyboard, mouse emulation, alternative pointing, voice recognition, coded input, prediction, structural navigation, extension], unordered
Description	Collection of needs and preferences for how to configure **alternative access systems** for controlling a device.

6.12.1 'Input Requirements' Attribute Description

Table 6.85 Description of the 'input requirements' attribute for the Control class.

Descriptor	Definition
Attribute name	input requirements
Data type	Enumerated vocabulary: Control_Flexibility_Vocabulary
Value space	The enumerated vocabulary is: { full keyboard control | full mouse control }.
Multiplicity	[0..1]
Description	Single input system that is sufficient to control a **resource**. The value space for this vocabulary is approved by IMS GLC. The syntax and semantics of the approved list of terms shall be supported by all software components implementing this Information Model. The value space for the vocabulary may be extended. Such extensions may be created and used only when no approved IMS GLC value satisfies the expressive need of an implementing community to define the shape of a collection.

6.12.2 'Keyboard Enhancement' Attribute Description

Table 6.86 Description of the 'key board enhancement' attribute for the Control class.

Descriptor	Definition
Attribute name	keyboard enhancement
Data type	Keyboard_Enhancement
Value space	Container
Multiplicity	[0..1]
Description	Collection of needs and preferences for how to configure accessibility enhancements for a standard keyboard.

6.12.3 'Onscreen keyboard' Attribute Description

Table 6.87 Description of the 'onscreen keyboard' attribute for the Control class.

Descriptor	Definition
Attribute name	onscreen keyboard
Data type	Onscreen_Keyboard
Value space	Container
Multiplicity	[0..1]
Description	Collection of needs and preferences for how to configure an *onscreen keyboard*.

6.12.4 'Alternative Keyboard' Attribute Description

Table 6.88 Description of the 'alternative keyboard' attribute for the Control class.

Descriptor	Definition
Attribute name	alternative keyboard
Data type	Alternative_Keyboard
Value space	Container
Multiplicity	[0..1]
Description	Collection of needs and preferences for how to configure an *alternative keyboard*.

6.12.5 'Mouse Emulation' Attribute Description

Table 6.89 Description of the 'mouse emulation' attribute for the Control class.

Descriptor	Definition
Attribute name	mouse emulation
Data type	Mouse_Emulation
Value space	Container
Multiplicity	[0..1]
Description	Collection of needs and preferences for how to configure a replacement for a standard mouse. EXAMPLES: keyboard, voice recognition, a switch, or another non-pointing device.

6.12.6 'Alternative Pointing' Attribute Description

Table 6.90 Description of the 'alternative pointing' attribute for the Control class.

Descriptor	Definition
Attribute name	alternative pointing
Data type	Alternative_Pointing
Value space	Container
Multiplicity	[0..1]
Description	Collection of needs and preferences for how to configure an *alternative pointing device*.

6.12.7 'Voice Recognition' Attribute Description

Table 6.91 Description of the 'voice recognition' attribute for the Control class.

Descriptor	Definition
Attribute name	voice recognition
Data type	Voice_Recognition
Value space	Container
Multiplicity	[0..1]
Description	Collection of needs and preferences for how to configure a *voice recognition system*.

6.12.8 'Coded Input' Attribute Description

Table 6.92 Description of the 'coded input' attribute for the Control class.

Descriptor	Definition
Attribute name	coded input
Data type	Coded _Input
Value space	Container
Multiplicity	[0..1]
Description	Collection of data element that state needs and preferences for how to configure a *coded input* system.

6.12.9 'Prediction' Attribute Description

Table 6.93 Description of the 'prediction' attribute for the Control class.

Descriptor	Definition
Attribute name	prediction
Data type	Prediction
Value space	Container
Multiplicity	[0..1]
Description	Collection of data element that state needs and preferences for how to configure a *prediction system*.

6.12.10 'Structural Navigation' Attribute Description

Table 6.94 Description of the 'structural navigation' attribute for the Control class.

Descriptor	Definition
Attribute name	structural navigation
Data type	Structural_Navigation
Value space	Container
Multiplicity	[0..1]
Description	Collection of needs and preferences for how to move through content using the structure of the content.

6.12.11 'Extension' Attribute Description

Table 6.95 Description of the 'extension' attribute for the Control class.

Descriptor	Definition
Attribute name	extension
Data type	Unspecified
Value space	Defined in terms of how the Information Model is realized by a binding.
Multiplicity	[0..unbounded], unordered
Description	This is a placeholder. It informs bindings of this Information Model as to the valid locations for the inclusion that extend the parent class.

6.13 Keyboard_Enhancement Class Description

The PIM for the Keyboard_Enhancement data model is shown in Figure 6.12.

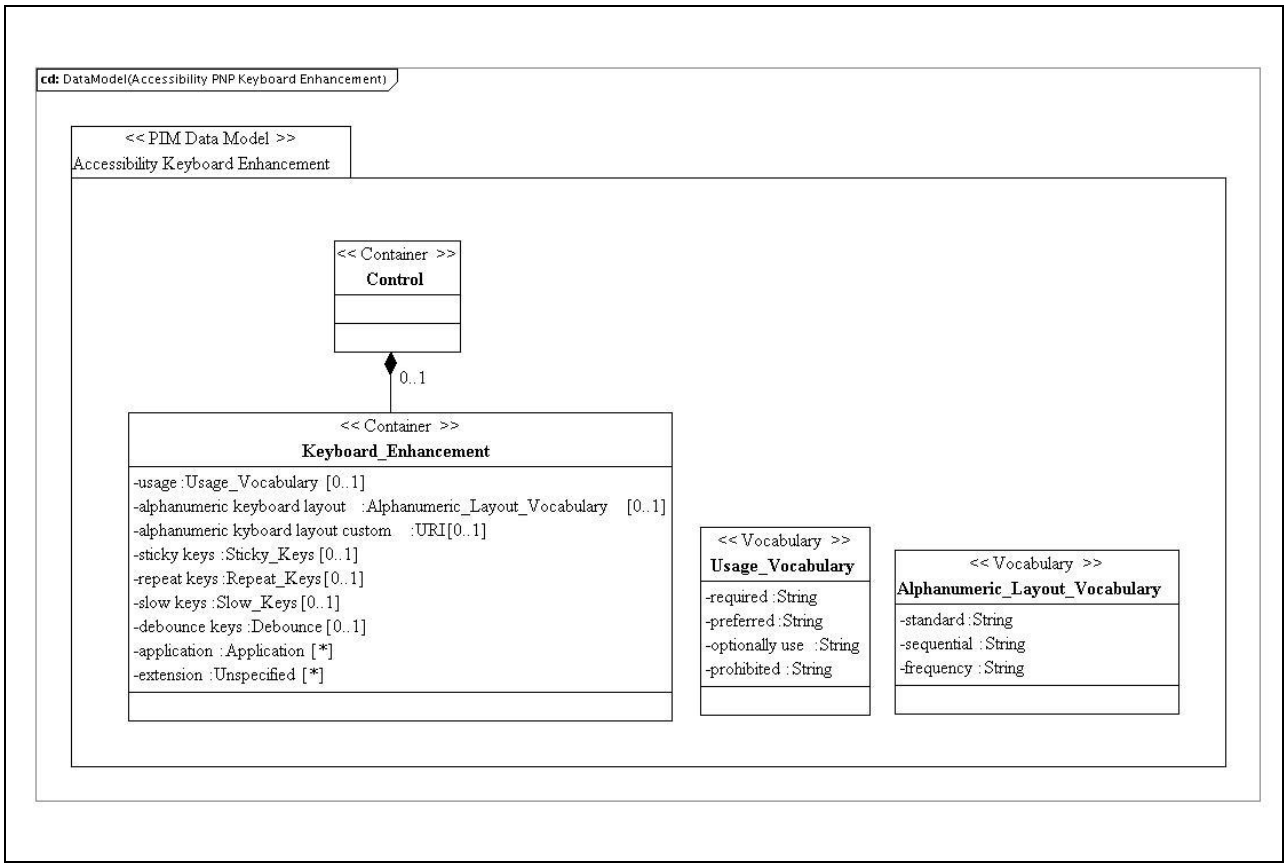


Figure 6.12 — Keyboard_Enhancement class diagram.

Table 6.96 Description of the 'Keyboard_Enhancement' class.

Descriptor	Definition
Class name	Keyboard_Enhancement
Class type	Container
Parents	Control
Children	[usage, alphanumeric keyboard layout, alphanumeric layout custom, sticky keys, repeat keys, slow keys, debounce keys, application, extension], unordered
Description	Collection of needs and preferences for how to configure accessibility enhancements for a standard keyboard.

6.13.1 'Usage' Attribute Description

Table 6.97 Description of the 'usage' attribute for the Keyboard_Enhancement class.

Descriptor	Definition
Attribute name	usage
Data type	Enumerated vocabulary: Usage_Vocabulary
Value space	The enumerated vocabulary is: { required | preferred | optionally use | prohibited }. Default=preferred.
Multiplicity	[0..1]
Description	Rating for the collection of AfA needs and preferences. The value space for this vocabulary is approved by IMS GLC. The syntax and semantics of the approved list of terms shall be supported by all software components implementing this Information Model. The value space for the vocabulary may be extended. Such extensions may be created and used only when no approved IMS GLC value satisfies the expressive need of an implementing community to define the shape of a collection.

6.13.2 'Alphanumeric Keyboard Layout' Attribute Description

Table 6.98 Description of the 'alphanumeric keyboard layout' attribute for the Control class.

Descriptor	Definition
Attribute name	alphanumeric keyboard layout
Data type	Enumerated vocabulary: Alphanumeric_Layout_Vocabulary
Value space	The enumerated vocabulary is: { standard | sequential | frequency }. Default=standard.
Multiplicity	[0..1]
Description	Spatial arrangement of the keys of an alphanumeric. The value space for this vocabulary is approved by IMS GLC. The syntax and semantics of the approved list of terms shall be supported by all software components implementing this Information Model. The value space for the vocabulary may be extended. Such extensions may be created and used only when no approved IMS GLC value satisfies the expressive need of an implementing community to define the shape of a collection.

6.13.3 'Alphanumeric Keyboard Layout Custom' Attribute Description

Table 6.99 Description of the 'alphanumeric keyboard layout custom' attribute for the Control class.

Descriptor	Definition
Attribute name	alphanumeric keyboard layout custom
Data type	URI
Value space	See Table 6.1.
Multiplicity	[0..1]
Description	Data element identifying a document containing a specification of a custom spatial arrangement of keys of an alphanumeric keyboard. NOTE: A custom layout is one that differs from any commonly used arrangements, and is arranged for ease of use by a particular user.

6.13.4 'Sticky Keys' Attribute Description

Table 6.100 Description of the 'sticky keys' attribute for the Control class.

Descriptor	Definition
Attribute name	sticky keys
Data type	Sticky Keys
Value space	Container
Multiplicity	[0..1]
Description	Collection of needs and preferences for the use of *sticky keys*.

6.13.5 'Repeat Keys' Attribute Description

Table 6.101 Description of the 'repeat keys' attribute for the Control class.

Descriptor	Definition
Attribute name	repeat keys
Data type	Repeat Keys
Value space	Container
Multiplicity	[0..1]
Description	Collection of needs and preferences for the use of *repeat keys*.

6.13.6 'Slow Keys' Attribute Description

Table 6.102 Description of the 'slow keys' attribute for the Control class.

Descriptor	Definition
Attribute name	slow keys
Data type	Slow Keys
Value space	Container
Multiplicity	[0..1]
Description	Collection of needs and preferences for the use of *slow keys*.

6.13.7 'Debounce Keys' Attribute Description

Table 6.103 Description of the 'debounce keys' attribute for the Control class.

Descriptor	Definition
Attribute name	debounce keys
Data type	Debounce Keys
Value space	Container
Multiplicity	[0..1]
Description	Collection of needs and preferences for the use of *debounce*.

6.13.8 'Application' Attribute Description

Table 6.104 Description of the 'application' attribute for the Control class.

Descriptor	Definition
Attribute name	application
Data type	Application
Value space	Container
Multiplicity	[0..unbounded], unordered
Description	Collection of needs and preferences for how to configure vendor-specific parameters of assistive technology.

6.13.9 'Extension' Attribute Description

Table 6.105 Description of the 'extension' attribute for the Control class.

Descriptor	Definition
Attribute name	extension
Data type	Unspecified
Value space	Defined in terms of how the Information Model is realized by a binding.
Multiplicity	[0..unbounded], unordered
Description	This is a placeholder. It informs bindings of this Information Model as to the valid locations for the inclusion that extend the parent class.

6.14 Onscreen_Keyboard Class Description

The PIM for the Onscreen_Keyboard data model is shown in Figure 6.13.

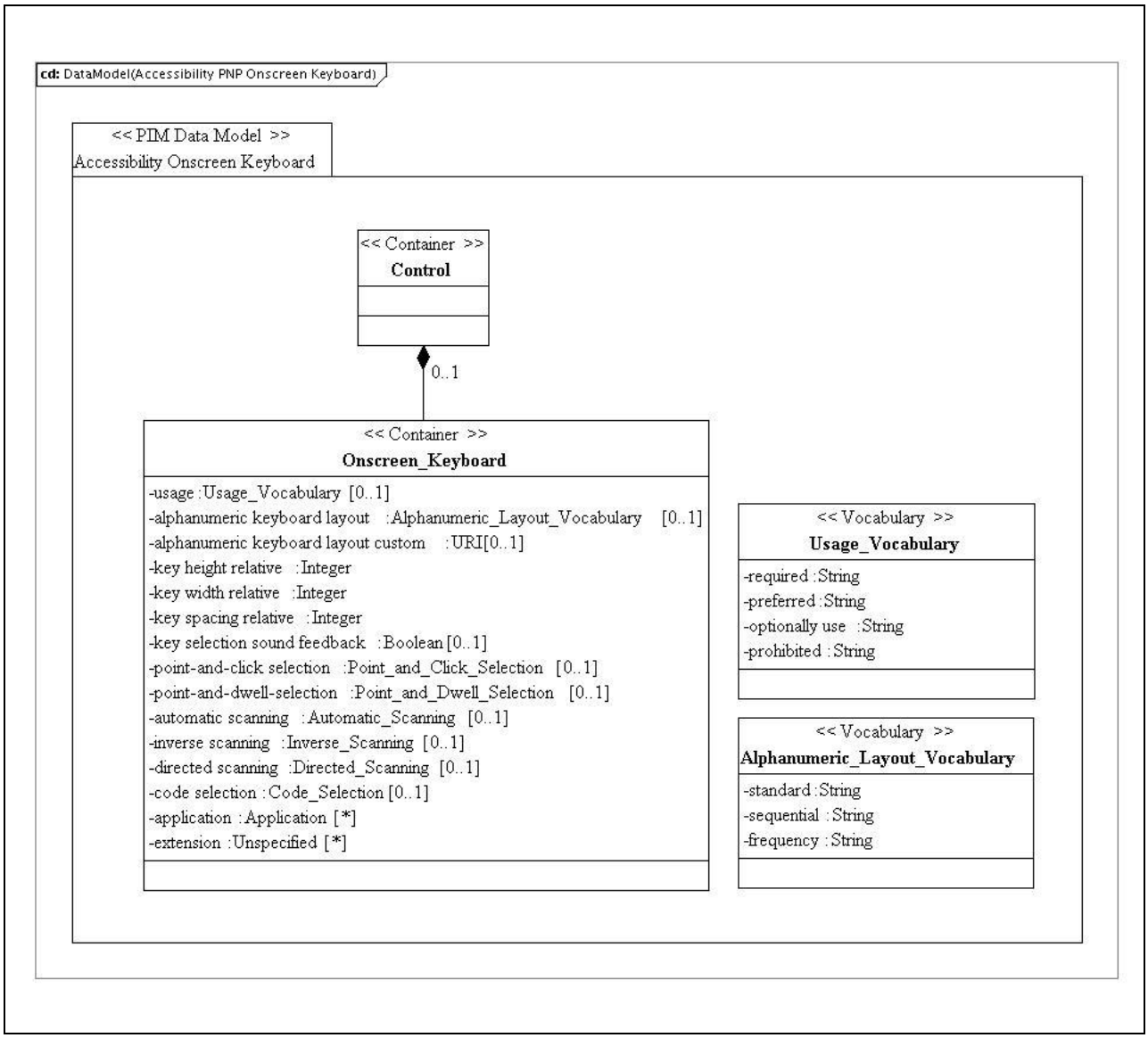


Figure 6.13 — Onscreen_Keyboard class diagram.

Table 6.106 Description of the 'Onscreen_Keyboard' class.

Descriptor	Definition
Class name	Onscreen_Keyboard
Class type	Container
Parents	Control
Children	[usage, alphanumeric keyboard layout, alphanumeric keyboard layout custom, key height relative, key width relative, key spacing relative, key selection sound feedback, point-and-click selection, point-and-dwell selection, automatic scanning, inverse scanning, directed scanning, code selection, application, extension], unordered
Description	Collection of needs and preferences for how to configure an *onscreen keyboard*.

6.14.1 'Usage' Attribute Description

Table 6.107 Description of the 'usage' attribute for the Onscreen_Keyboard class.

Descriptor	Definition
Attribute name	usage
Data type	Enumerated vocabulary: Usage_Vocabulary
Value space	The enumerated vocabulary is: {required | preferred | optionally use | prohibited }. Default=preferred.
Multiplicity	[0..1]
Description	Rating for the collection of AfA needs and preferences. The value space for this vocabulary is approved by IMS GLC. The syntax and semantics of the approved list of terms shall be supported by all software components implementing this Information Model. The value space for the vocabulary may be extended. Such extensions may be created and used only when no approved IMS GLC value satisfies the expressive need of an implementing community to define the shape of a collection.

6.14.2 'Alphanumeric Keyboard Layout' Attribute Description

Table 6.108 Description of the 'alphanumeric keyboard layout' attribute for the Onscreen_Keyboard class.

Descriptor	Definition
Attribute name	alphanumeric keyboard layout
Data type	Enumerated vocabulary: Alphanumeric_Layout_Vocabulary
Value space	The enumerated vocabulary is: { standard | sequential | frequency }. Default=standard.
Multiplicity	[0..1]
Description	Spatial arrangement of the keys of an alphanumeric. The value space for this vocabulary is approved by IMS GLC. The syntax and semantics of the approved list of terms shall be supported by all software components implementing this Information Model. The value space for the vocabulary may be extended. Such extensions may be created and used only when no approved IMS GLC value satisfies the expressive need of an implementing community to define the shape of a collection.

6.14.3 'Alphanumeric Keyboard Layout Custom' Attribute Description

Table 6.109 Description of the 'alphanumeric keyboard layout custom' attribute for the Onscreen_Keyboard class.

Descriptor	Definition
Attribute name	alphanumeric keyboard layout custom
Data type	URI
Value space	See Table 6.1.
Multiplicity	[0..1]
Description	Data element identifying a document containing a specification of a custom spatial arrangement of keys of an alphanumeric keyboard. NOTE: A custom layout is one that differs from any commonly used arrangements, and is arranged for ease of use by a particular user.

6.14.4 'Key Height Relative' Attribute Description

Table 6.110 Description of the 'key height relative' attribute for the Onscreen_Keyboard class.

Descriptor	Definition
Attribute name	key height relative
Data type	Integer
Value space	0 ≤ key height relative ≤ 100. Default=3.
Multiplicity	[1]
Description	Height of a key in an *onscreen keyboard* as a percentage of the screen height.

6.14.5 'Key Width Relative' Attribute Description

Table 6.111 Description of the 'key width relative' attribute for the Onscreen_Keyboard class.

Descriptor	Definition
Attribute name	key width relative
Data type	Integer
Value space	0 ≤ key width relative ≤ 100. Default=4.
Multiplicity	[1]
Description	Height of a key in an *onscreen keyboard* as a percentage of the screen width.

6.14.6 'Key Spacing Relative' Attribute Description

Table 6.112 Description of the 'key spacing relative' attribute for the Onscreen_Keyboard class.

Descriptor	Definition
Attribute name	key spacing relative
Data type	Integer
Value space	0 ≤ key spacing relative ≤ 100. Default=0.
Multiplicity	[1]
Description	Spacing between keys in an *onscreen keyboard* as a percentage of the screen width.

6.14.7 'Key Selection Sound Feedback' Attribute Description

Table 6.113 Description of the 'key selection sound feedback' attribute for the Onscreen_Keyboard class.

Descriptor	Definition
Attribute name	key selection sound feedback
Data type	Boolean
Value space	Enumerated: { true | false }. Default=true.
Multiplicity	[0..1]
Description	Preference for sound feedback when a key is selected.

6.14.8 'Point-and-Click Selection' Attribute Description

Table 6.114 Description of the 'point-and-click-selection' attribute for the Onscreen_Keyboard class.

Descriptor	Definition
Attribute name	point-and-click selection
Data type	Point_And_Click_Selection
Value space	Container
Multiplicity	[0..1]
Description	Collection of needs and preferences for the use of a *point-and-click* interface.

6.14.9 'Point-and-Dwell Selection' Attribute Description

Table 6.115 Description of the 'point-and-dwell-selection' attribute for the Onscreen_Keyboard class.

Descriptor	Definition
Attribute name	point-and-dwell selection
Data type	Point_And_Dwell_Selection
Value space	Container
Multiplicity	[0..1]
Description	Collection of needs and preferences for the use of a *point-and-dwell* interface.

6.14.10 'Automatic Scanning' Attribute Description

Table 6.116 Description of the 'automatic scanning' attribute for the Onscreen_Keyboard class.

Descriptor	Definition
Attribute name	automatic scanning
Data type	Automatic_Scanning
Value space	Container
Multiplicity	[0..1]
Description	Collection of needs and preferences for the use of an *automatic scanning interface*.

6.14.11 'Inverse Scanning' Attribute Description

Table 6.117 Description of the 'inverse scanning' attribute for the Onscreen_Keyboard class.

Descriptor	Definition
Attribute name	inverse scanning
Data type	Inverse_Scanning
Value space	Container
Multiplicity	[0..1]
Description	Collection of needs and preferences for the use of an *inverse scanning interface*.

6.14.12 'Directed Scanning' Attribute Description

Table 6.118 Description of the 'directed scanning' attribute for the Onscreen_Keyboard class.

Descriptor	Definition
Attribute name	directed scanning
Data type	Directed_Scanning
Value space	Container
Multiplicity	[0..1]
Description	Collection of needs and preferences for the use of a *directed scanning interface*.

6.14.13 'Code Selection' Attribute Description

Table 6.119 Description of the 'code selection' attribute for the Onscreen_Keyboard class.

Descriptor	Definition
Attribute name	code selection
Data type	Code_Selection
Value space	Container
Multiplicity	[0..1]
Description	Collection of needs and preferences for the use of *code selection*.

6.14.14 'Application' Attribute Description

Table 6.120 Description of the 'application' attribute for the Onscreen_Keyboard class.

Descriptor	Definition
Attribute name	application
Data type	Application
Value space	Container
Multiplicity	[0..unbounded], unordered
Description	Collection of needs and preferences for how to configure vendor-specific parameters of assistive technology.

6.14.15 'Extension' Attribute Description

Table 6.121 Description of the 'extension' attribute for the Onscreen_Keyboard class.

Descriptor	Definition
Attribute name	extension
Data type	Unspecified
Value space	Defined in terms of how the Information Model is realized by a binding.
Multiplicity	[0..unbounded], unordered
Description	This is a placeholder. It informs bindings of this Information Model as to the valid locations for the inclusion that extend the parent class.

6.15 Alternative_Keyboard Class Description

The PIM for the Alternative_Keyboard data model is shown in Figure 6.14.

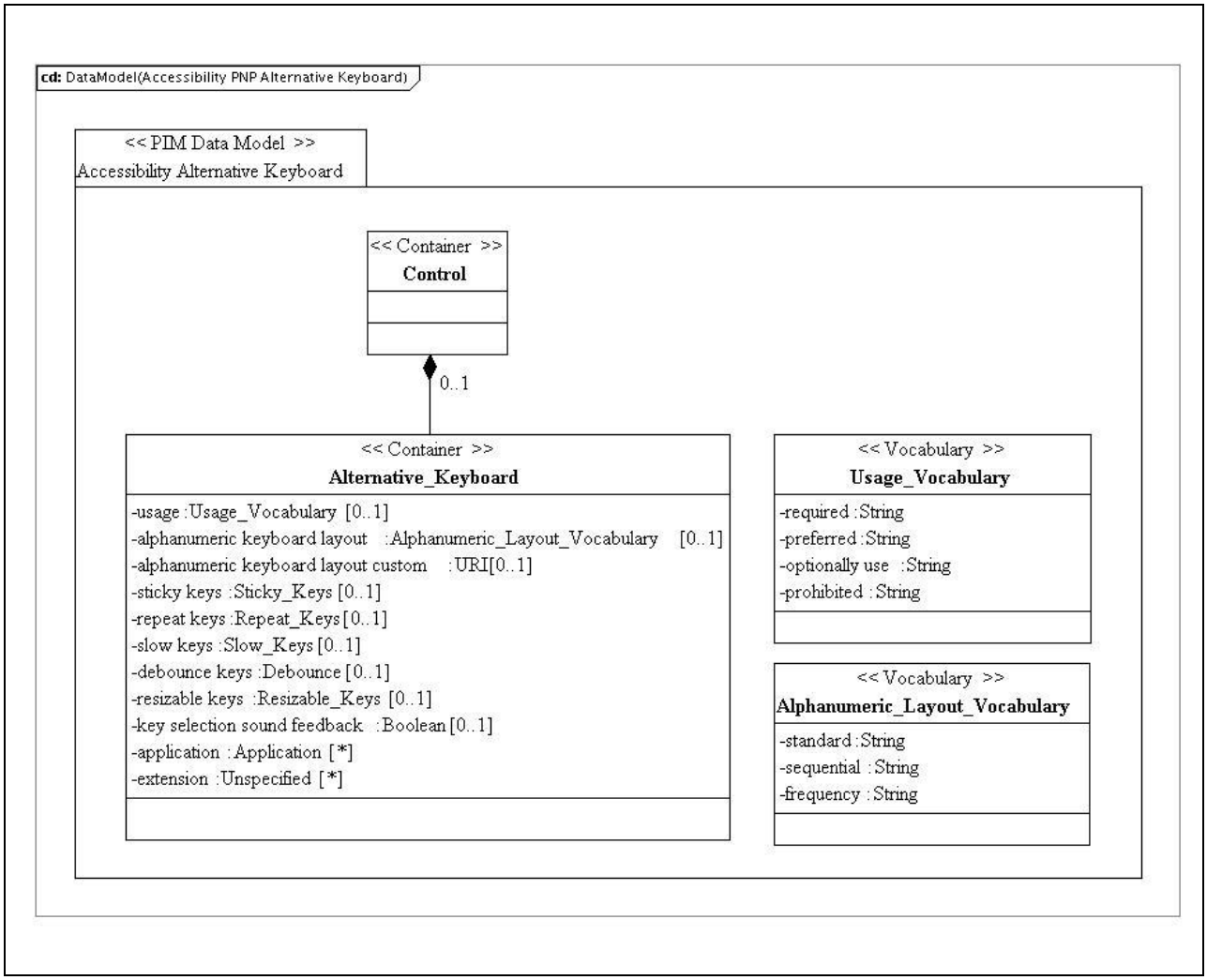


Figure 6.14 — Alternative_Keyboard class diagram.

Table 6.122 Description of the 'Alternative_Keyboard' class.

Descriptor	Definition
Class name	Alternative_Keyboard
Class type	Container
Parents	Control
Children	[usage, alphanumeric keyboard layout, alphanumeric keyboard layout custom, sticky keys, repeat keys, sow keys, debounce keys, resizable keys, key selection sound feedback, application, extension], unordered
Description	Collection of needs and preferences for how to configure an *alternative keyboard*.

6.15.1 'Usage' Attribute Description

Table 6.123 Description of the 'usage' attribute for the Alternative_Keyboard class.

Descriptor	Definition
Attribute name	usage
Data type	Enumerated vocabulary: Usage_Vocabulary
Value space	The enumerated vocabulary is: {required | preferred | optionally use | prohibited }. Default=preferred.
Multiplicity	[0..1]
Description	Rating for the collection of AfA needs and preferences. The value space for this vocabulary is approved by IMS GLC. The syntax and semantics of the approved list of terms shall be supported by all software components implementing this Information Model. The value space for the vocabulary may be extended. Such extensions may be created and used only when no approved IMS GLC value satisfies the expressive need of an implementing community to define the shape of a collection.

6.15.2 'Alphanumeric Keyboard Layout' Attribute Description

Table 6.124 Description of the 'alphanumeric keyboard layout' attribute for the Alternative_Keyboard class.

Descriptor	Definition
Attribute name	alphanumeric keyboard layout
Data type	Enumerated vocabulary: Alphanumeric_Layout_Vocabulary
Value space	The enumerated vocabulary is: { standard | sequential | frequency }. Default=standard.
Multiplicity	[0..1]
Description	Spatial arrangement of the keys of an alphanumeric. The value space for this vocabulary is approved by IMS GLC. The syntax and semantics of the approved list of terms shall be supported by all software components implementing this Information Model. The value space for the vocabulary may be extended. Such extensions may be created and used only when no approved IMS GLC value satisfies the expressive need of an implementing community to define the shape of a collection.

6.15.3 'Alphanumeric Keyboard Layout Custom' Attribute Description

Table 6.125 Description of the 'alphanumeric keyboard layout custom' attribute for the Alternative_Keyboard class.

Descriptor	Definition
Attribute name	alphanumeric keyboard layout custom
Data type	URI
Value space	See Table 6.1.
Multiplicity	[0..1]
Description	Data element identifying a document containing a specification of a custom spatial arrangement of keys of an alphanumeric keyboard. NOTE: A custom layout is one that differs from any commonly used arrangements, and is arranged for ease of use by a particular user.

6.15.4 'Sticky Keys' Attribute Description

Table 6.126 Description of the 'sticky keys' attribute for the Alternative_Keyboard class.

Descriptor	Definition
Attribute name	sticky keys
Data type	Sticky Keys
Value space	Container
Multiplicity	[0..1]
Description	Collection of needs and preferences for the use of *sticky keys*.

6.15.5 'Repeat Keys' Attribute Description

Table 6.127 Description of the 'repeat keys' attribute for the Alternative_Keyboard class.

Descriptor	Definition
Attribute name	repeat keys
Data type	Repeat Keys
Value space	Container
Multiplicity	[0..1]
Description	Collection of needs and preferences for the use of *repeat keys*.

6.15.6 'Slow Keys' Attribute Description

Table 6.128 Description of the 'slow keys' attribute for the Alternative_Keyboard class.

Descriptor	Definition
Attribute name	slow keys
Data type	Slow Keys
Value space	Container
Multiplicity	[0..1]
Description	Collection of needs and preferences for the use of *slow keys*.

6.15.7 'Debounce Keys' Attribute Description

Table 6.129 Description of the 'debounce keys' attribute for the Alternative_Keyboard class.

Descriptor	Definition
Attribute name	debounce keys
Data type	Debounce Keys
Value space	Container
Multiplicity	[0..1]
Description	Collection of needs and preferences for the use of *debounce*.

6.15.8 'Resizable Keys' Attribute Description

Table 6.130 Description of the 'resizable keys' attribute for the Alternative_Keyboard class.

Descriptor	Definition
Attribute name	resizable keys
Data type	Resizable_Keys
Value space	Container
Multiplicity	[0..1]
Description	Collection of data elements that states a preference for how to configure keys when an *alternative keyboard* allows key sizes to be adjusted.

6.15.9 'Key Selection Sound Feedback' Attribute Description

Table 6.131 Description of the 'key selection sound feedback' attribute for the Alternative_Keyboard class.

Descriptor	Definition
Attribute name	key selection sound feedback
Data type	Boolean
Value space	Enumerated as: { true | false }. Default=true.
Multiplicity	[0..1]
Description	Preference for sound feedback when a key is selected.

6.15.10 'Application' Attribute Description

Table 6.132 Description of the 'application' attribute for the Alternative_Keyboard class.

Descriptor	Definition
Attribute name	application
Data type	Application
Value space	Container
Multiplicity	[0..unbounded], unordered
Description	Collection of needs and preferences for how to configure vendor-specific parameters of assistive technology.

6.15.11 'Extension' Attribute Description

Table 6.133 Description of the 'extension' attribute for the Alternative_Keyboard class.

Descriptor	Definition
Attribute name	extension
Data type	Unspecified
Value space	Defined in terms of how the Information Model is realized by a binding.
Multiplicity	[0..unbounded], unordered
Description	This is a placeholder. It informs bindings of this Information Model as to the valid locations for the inclusion that extend the parent class.

6.16 Mouse_Emulation Class Description

The PIM for the Mouse_Emulation data model is shown in Figure 6.15.

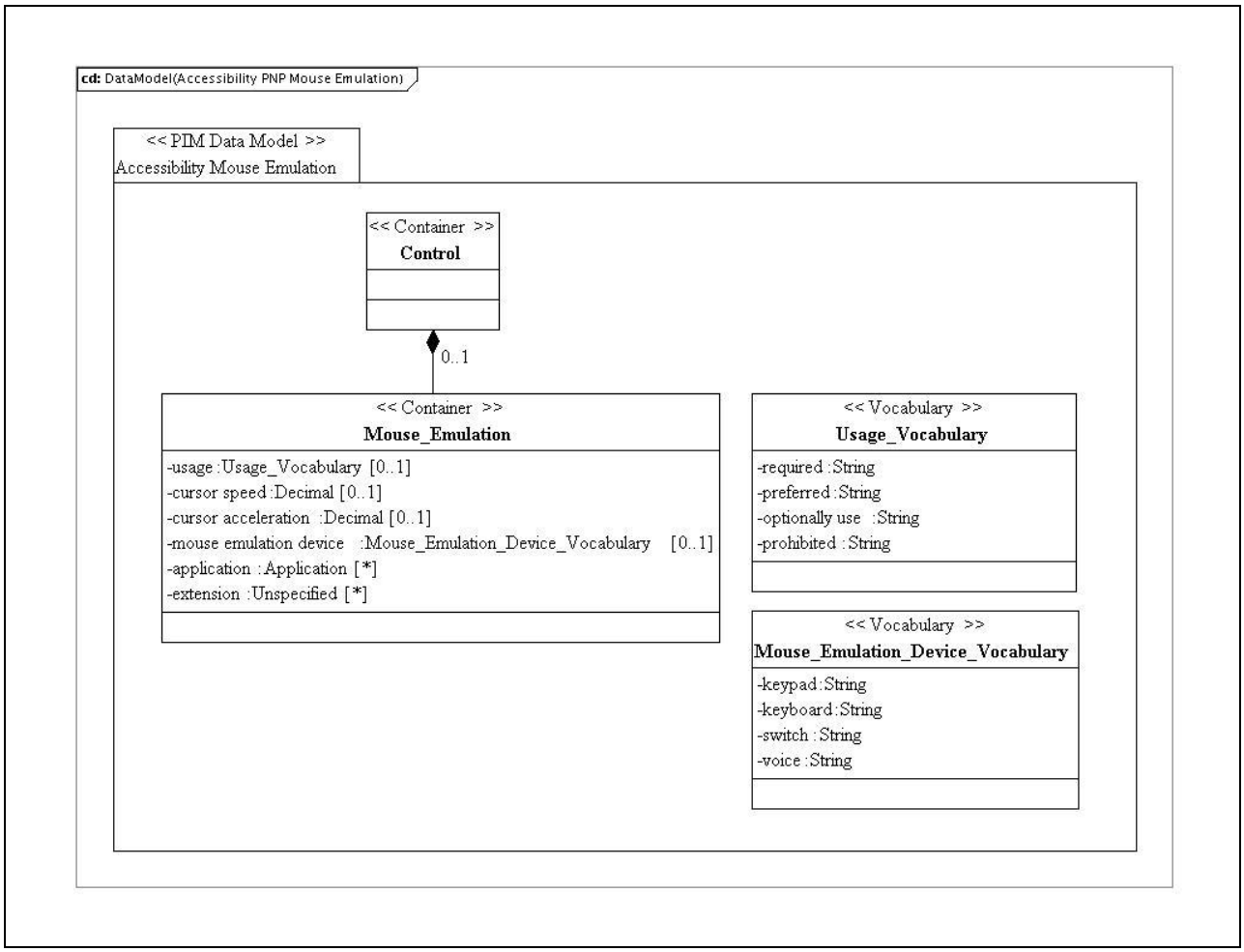


Figure 6.15 — Mouse_Emulation class diagram.

Table 6.134 Description of the 'Mouse_Emulation' class.

Descriptor	Definition
Class name	Mouse_Emulation
Class type	Container
Parents	Control
Children	[usage, cursor speed, cursor acceleration, mouse emulation device, application, extension], unordered
Description	Collection of needs and preferences for how to configure a replacement for a standard mouse. EXAMPLES: A keyboard, voice recognition, a switch, or another non-pointing device.

6.16.1 'Usage' Attribute Description

Table 6.135 Description of the 'usage' attribute for the Mouse_Emulation class.

Descriptor	Definition
Attribute name	usage
Data type	Enumerated vocabulary: Usage_Vocabulary
Value space	The enumerated vocabulary is: {required | preferred | optionally use | prohibited }. Default=preferred.
Multiplicity	[0..1]
Description	Rating for the collection of AfA needs and preferences. The value space for this vocabulary is approved by IMS GLC. The syntax and semantics of the approved list of terms shall be supported by all software components implementing this Information Model. The value space for the vocabulary may be extended. Such extensions may be created and used only when no approved IMS GLC value satisfies the expressive need of an implementing community to define the shape of a collection.

6.16.2 'Cursor Speed' Attribute Description

Table 6.136 Description of the 'cursor speed' attribute for the Mouse_Emulation class.

Descriptor	Definition
Attribute name	cursor speed
Data type	Decimal (10,4)
Value space	0.0 ≤ cursor speed ≤ 1.0. Default=0.5.
Multiplicity	[0..1]
Description	Speed at which a *"mouse" cursor* or *relative pointing device* moves across the screen. NOTE Use 0.0 = "slow", 0.5 = "medium", 1.0 = "fast".

6.16.3 'Cursor Acceleration' Attribute Description

Table 6.137 Description of the 'cursor speed' attribute for the Mouse_Emulation class.

Descriptor	Definition
Attribute name	cursor acceleration
Data type	Decimal (10,4)
Value space	0.0 ≤ cursor acceleration ≤ 1.0. Default=0.5.
Multiplicity	[0..1]
Description	Initial value for the acceleration of a *"mouse" cursor* or *relative pointing device* from rest to its closing speed. NOTE Use 0.0 = "slow", 0.5 = "medium", 1.0 = "fast".

6.16.4 'Mouse Emulation Device' Attribute Description

Table 6.138 Description of the 'mouse emulation device' attribute for the Mouse_Emulation class.

Descriptor	Definition
Attribute name	mouse emulation device
Data type	Enumerated vocabulary: Mouse_Emulation_Device_Vocabulary
Value space	The enumerated vocabulary is: { keypad | keyboard | switch | voice }. Default=keypad.
Multiplicity	[0..1]
Description	Device to use to emulate a mouse NOTE Single switches can be used to iteratively *scan* and select a point on the display. The value space for this vocabulary is approved by IMS GLC. The syntax and semantics of the approved list of terms shall be supported by all software components implementing this Information Model. The value space for the vocabulary may be extended. Such extensions may be created and used only when no approved IMS GLC value satisfies the expressive need of an implementing community to define the shape of a collection.

6.16.5 'Application' Attribute Description

Table 6.139 Description of the 'application' attribute for the Mouse_Emulation class.

Descriptor	Definition
Attribute name	application
Data type	Application
Value space	Container
Multiplicity	[0..unbounded], unordered
Description	Collection of needs and preferences for how to configure vendor-specific parameters of assistive technology.

6.16.6 'Extension' Attribute Description

Table 6.140 Description of the 'extension' attribute for the Mouse_Emulation class.

Descriptor	Definition
Attribute name	extension
Data type	Unspecified
Value space	Defined in terms of how the Information Model is realized by a binding.
Multiplicity	[0..unbounded], unordered
Description	This is a placeholder. It informs bindings of this Information Model as to the valid locations for the inclusion that extend the parent class.

6.17 Alternative_Pointing Class Description

The PIM for the Alternative_Pointing data model is shown in Figure 6.16.

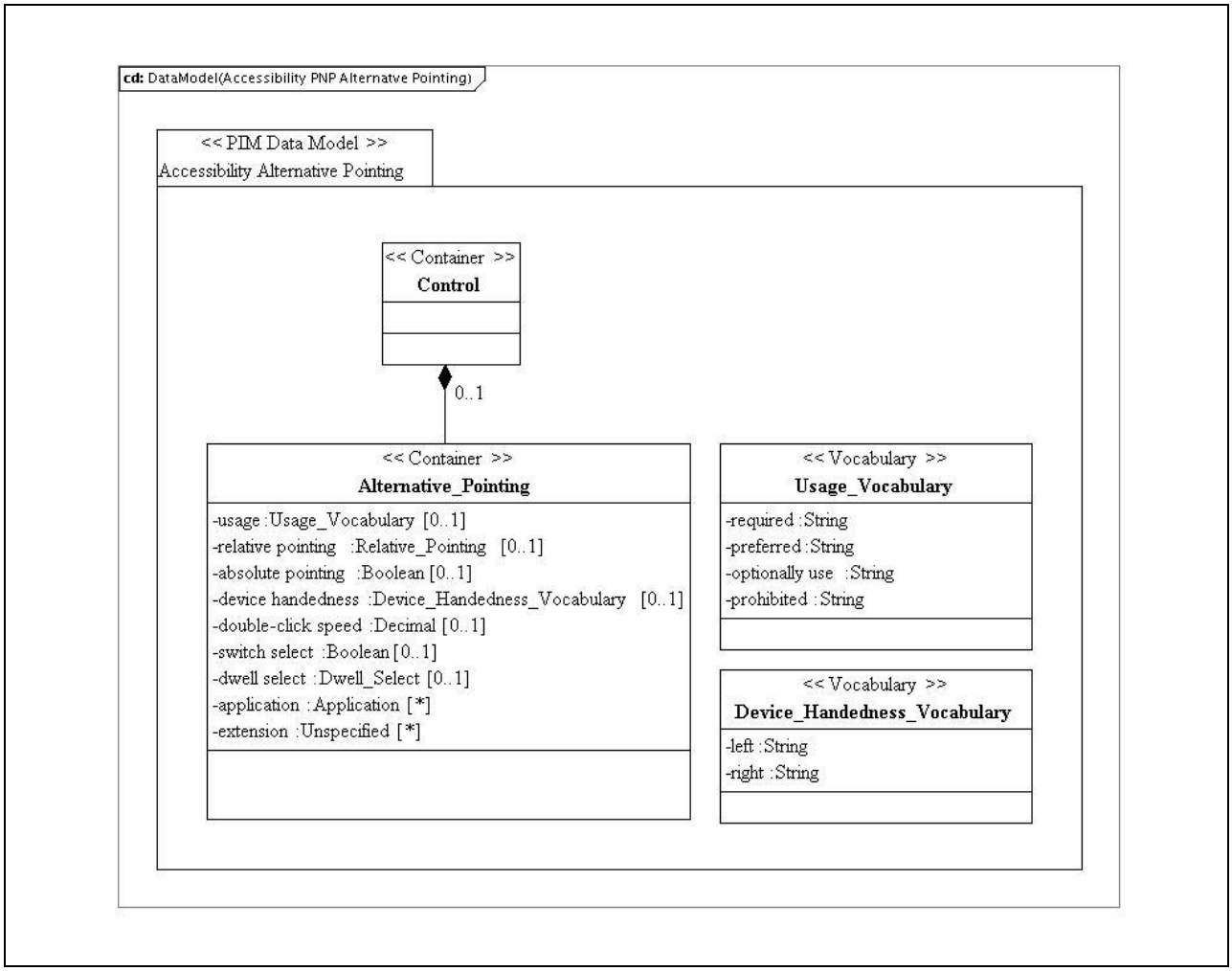


Figure 6.16 — Alternatve_Pointing class diagram.

Table 6.141 Description of the 'Alternatve_Pointing' class.

Descriptor	Definition
Class name	Alternative_Pointing
Class type	Container
Parents	Control
Children	[usage, relative pointing, absolute pointing, device handedness, double-click speed, switch select, dwell select, application, extension], unordered
Description	Collection of needs and preferences for how to configure an *alternative pointing device*.

6.17.1 'Usage' Attribute Description

Table 6.142 Description of the 'usage' attribute for the Alternative_Pointing class.

Descriptor	Definition
Attribute name	usage
Data type	Enumerated vocabulary: Usage_Vocabulary
Value space	The enumerated vocabulary is: { required | preferred | optionally use | prohibited }. Default=preferred.
Multiplicity	[0..1]
Description	Rating for the collection of AfA needs and preferences. The value space for this vocabulary is approved by IMS GLC. The syntax and semantics of the approved list of terms shall be supported by all software components implementing this Information Model. The value space for the vocabulary may be extended. Such extensions may be created and used only when no approved IMS GLC value satisfies the expressive need of an implementing community to define the shape of a collection.

6.17.2 'Relative Pointing' Attribute Description

Table 6.143 Description of the 'relative pointing' attribute for the Alternative_Pointing class.

Descriptor	Definition
Attribute name	relative pointing
Data type	Relative_Pointing
Value space	Container
Multiplicity	[0..1]
Description	Collection of needs and preferences for how to configure a *relative pointing device* NOTE Mutually exclusive with absolute pointing.

6.17.3 'Absolute Pointing' Attribute Description

Table 6.144 Description of the 'absolute pointing' attribute for the Alternative_Pointing class.

Descriptor	Definition
Attribute name	absolute pointing
Data type	Boolean
Value space	Enumerated as: { true | false }.
Multiplicity	[0.1]
Description	Preference to use an *absolute pointing device* instead of a *relative pointing device* NOTE Mutually exclusive with relative pointing.

6.17.4 'Device Handedness' Attribute Description

Table 6.145 Description of the 'device handedness' attribute for the Alternative_Pointing class.

Descriptor	Definition
Attribute name	device handedness
Data type	Enumerated vocabulary: Device_Handedness_Vocabulary
Value space	The enumerated vocabulary is: { left | right }. Default=right.
Multiplicity	[0..1]
Description	Either a left-handed or right-handed pointing device.

6.17.5 'Double-Click Speed' Attribute Description

Table 6.146 Description of the 'double-click speed' attribute for the Alternative_Pointing class.

Descriptor	Definition
Attribute name	double-click speed
Data type	Decimal (10,4)
Value space	0.0 < double-click speed. Default=0.4 seconds.
Multiplicity	[0..1]
Description	Time, in seconds, in which two successive clicks must occur in order to be registered as a double-click.

6.17.6 'Switch Select' Attribute Description

Table 6.147 Description of the 'switch select' attribute for the Alternative_Pointing class.

Descriptor	Definition
Attribute name	switch select
Data type	Boolean
Value space	Enumerated as: { true | false }.
Multiplicity	[0..1]
Description	Preference to use a click for selection when using an *alternative pointing device.* NOTE Mutually exclusive with dwell select.

6.17.7 'Dwell Select' Attribute Description

Table 6.148 Description of the 'dwell select' attribute for the Alternative_Pointing class.

Descriptor	Definition
Attribute name	dwell select
Data type	Dwell_Select
Value space	Container
Multiplicity	[0..1]
Description	Preference to use dwell for selection when using an *alternative pointing device.* NOTE Mutually exclusive with switch select.

6.17.8 'Application' Attribute Description

Table 6.149 Description of the 'application' attribute for the Alternative_Pointing class.

Descriptor	Definition
Attribute name	application
Data type	Application
Value space	Container
Multiplicity	[0..unbounded], unordered
Description	Collection of needs and preferences for how to configure vendor-specific parameters of assistive technology.

6.17.9 'Extension' Attribute Description

Table 6.150 Description of the 'extension' attribute for the Alternative_Pointing class.

Descriptor	Definition
Attribute name	extension
Data type	Unspecified
Value space	Defined in terms of how the Information Model is realized by a binding.
Multiplicity	[0..unbounded], unordered
Description	This is a placeholder. It informs bindings of this Information Model as to the valid locations for the inclusion that extend the parent class.

6.18 Voice_Recognition Class Description

The PIM for the Voice_Recognition data model is shown in Figure 6.17.

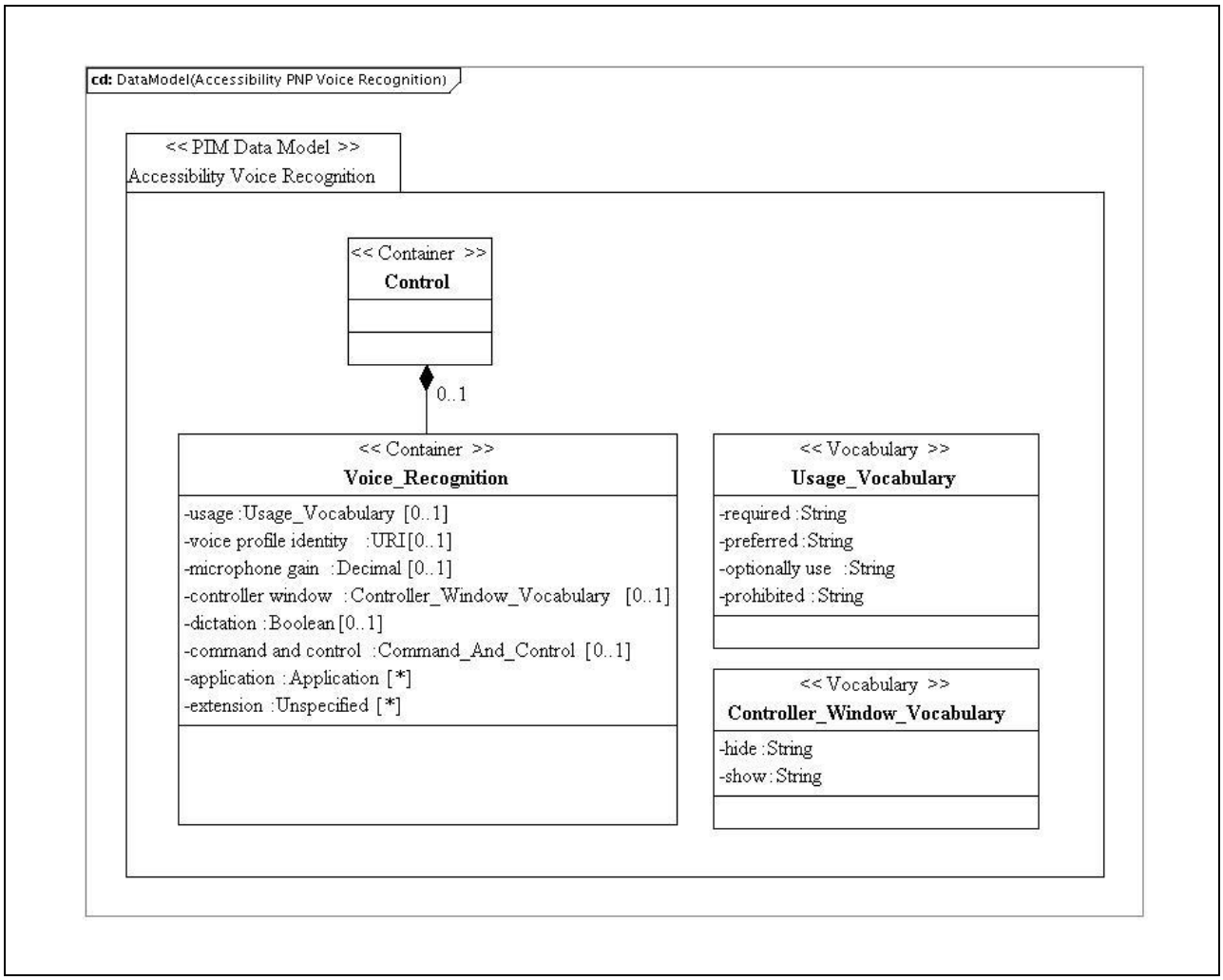


Figure 6.17 — Voice_Recognition class diagram.

Table 6.151 Description of the 'Voice_Recognition' class.

Descriptor	Definition
Class name	Voice_Recognition
Class type	Container
Parents	Control
Children	[usage, voice profile identity, microphone gain, controller window, dictation, command and control, application, extension], unordered
Description	Collection of needs and preferences for how to configure a *voice recognition system*.

6.18.1 'Usage' Attribute Description

Table 6.152 Description of the 'usage' attribute for the Voice_Recognition class.

Descriptor	Definition
Attribute name	usage
Data type	Enumerated vocabulary: Usage_Vocabulary
Value space	The enumerated vocabulary is: { required | preferred | optionally use | prohibited }. Default=preferred.
Multiplicity	[0..1]
Description	Rating for the collection of AfA needs and preferences. The value space for this vocabulary is approved by IMS GLC. The syntax and semantics of the approved list of terms shall be supported by all software components implementing this Information Model. The value space for the vocabulary may be extended. Such extensions may be created and used only when no approved IMS GLC value satisfies the expressive need of an implementing community to define the shape of a collection.

6.18.2 'Voice Profile Identity' Attribute Description

Table 6.153 Description of the 'usage' attribute for the Voice_Recognition class.

Descriptor	Definition
Attribute name	voice profile identity
Data type	URI
Value space	See Table 6.1.
Multiplicity	[0..1]
Description	Data element identifying an external file containing a *voice recognition system voice profile*.

6.18.3 'Microphone Gain' Attribute Description

Table 6.154 Description of the 'microphone gain' attribute for the Voice_Recognition class.

Descriptor	Definition
Attribute name	microphone gain
Data type	Decimal (10, 4)
Value space	0.0 ≤ microphone gain ≤ 1.0. Default=0.5.
Multiplicity	[0..1]
Description	Sensitivity of a microphone. NOTE Use 0.0 = "low", 0.5 = "medium", 1.0 = "high".

6.18.4 'Controller Window' Attribute Description

Table 6.155 Description of the 'controller window' attribute for the Voice_Recognition class.

Descriptor	Definition
Attribute name	controller window
Data type	Enumerated vocabulary: Controller_Window_Vocabulary
Value space	The enumerated vocabulary is: { hide | show }. Default=show.
Multiplicity	[0..1]
Description	Display of a *voice recognition system controller window*. The value space for this vocabulary is approved by IMS GLC. The syntax and semantics of the approved list of terms shall be supported by all software components implementing this Information Model. The value space for the vocabulary may be extended. Such extensions may be created and used only when no approved IMS GLC value satisfies the expressive need of an implementing community to define the shape of a collection.

6.18.5 'Dictation' Attribute Description

Table 6.156 Description of the 'dictation' attribute for the Voice_Recognition class.

Descriptor	Definition
Attribute name	dictation
Data type	Boolean
Value space	Enumerated as: { true | false }. Default=false.
Multiplicity	[0..1]
Description	Preference to use dictation with a *voice recognition system*.

6.18.6 'Command and Control' Attribute Description

Table 6.157 Description of the 'command and control' attribute for the Voice_Recognition class.

Descriptor	Definition
Attribute name	command and control
Data type	Command_And_Control
Value space	Container
Multiplicity	[0..1]
Description	Collection of needs and preferences for a *voice recognition system's* command and control settings.

6.18.7 'Application' Attribute Description

Table 6.158 Description of the 'application' attribute for the Voice_Recognition class.

Descriptor	Definition
Attribute name	application
Data type	Application
Value space	Container
Multiplicity	[0..unbounded], unordered
Description	Collection of needs and preferences for how to configure vendor-specific parameters of assistive technology.

6.18.8 'Extension' Attribute Description

Table 6.159 Description of the 'extension' attribute for the Voice_Recognition class.

Descriptor	Definition
Attribute name	extension
Data type	Unspecified
Value space	Defined in terms of how the Information Model is realized by a binding.
Multiplicity	[0..unbounded], unordered
Description	This is a placeholder. It informs bindings of this Information Model as to the valid locations for the inclusion that extend the parent class.

6.19 Coded_Input Class Description

The PIM for the Coded_Input data model is shown in Figure 6.18.

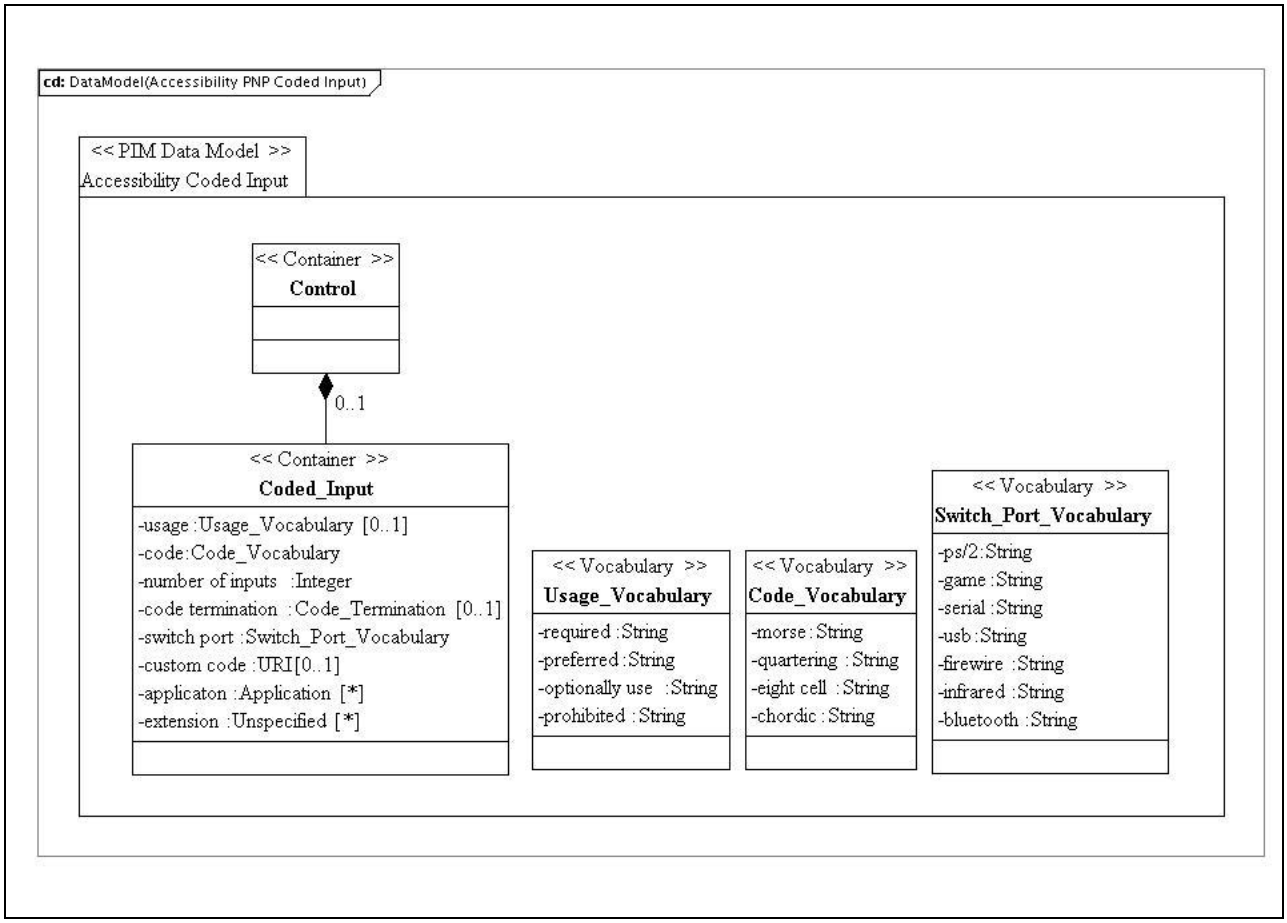


Figure 6.18 — Coded_Input class diagram.

Table 6.160 Description of the 'Coded_Input' class.

Descriptor	Definition
Class name	Coded_Input
Class type	Container
Parents	Control
Children	[usage, code, number of inputs, code termination, switch port, custom code, application, extension]
Description	Collection of data element that state needs and preferences for how to configure a *coded input* system.

6.19.1 'Usage' Attribute Description

Table 6.161 Description of the 'usage' attribute for the Coded_Input class.

Descriptor	Definition
Attribute name	usage
Data type	Enumerated vocabulary: Usage_Vocabulary
Value space	The enumerated vocabulary is: { required | preferred | optionally use | prohibited }. Default=preferred.
Multiplicity	[0..1]
Description	Rating for the collection of AfA needs and preferences. The value space for this vocabulary is approved by IMS GLC. The syntax and semantics of the approved list of terms shall be supported by all software components implementing this Information Model. The value space for the vocabulary may be extended. Such extensions may be created and used only when no approved IMS GLC value satisfies the expressive need of an implementing community to define the shape of a collection.

6.19.2 'Code' Attribute Description

Table 6.162 Description of the 'code' attribute for the Coded_Input class.

Descriptor	Definition
Attribute name	code
Data type	Enumerated vocabulary: Code_Vocabulary
Value space	The enumerated vocabulary is: { morse | quartering | eight cell | chordic }. Default=morse.
Multiplicity	[0..1]
Description	Code to use to represent possible inputs. The value space for this vocabulary is approved by IMS GLC. The syntax and semantics of the approved list of terms shall be supported by all software components implementing this Information Model. The value space for the vocabulary may be extended. Such extensions may be created and used only when no approved IMS GLC value satisfies the expressive need of an implementing community to define the shape of a collection.

6.19.3 'Number of Inputs' Attribute Description

Table 6.163 Description of the 'number of inputs' attribute for the Coded_Input class.

Descriptor	Definition
Attribute name	number of inputs
Data type	Integer
Value space	1 ≤ number of inputs. Default=2.
Multiplicity	[1]
Description	Number of switches, keys or cells available to enter a code.

6.19.4 'Code Termination' Attribute Description

Table 6.164 Description of the 'code termination' attribute for the Coded_Input class.

Descriptor	Definition
Attribute name	code termination
Data type	Code_Termination
Value space	Container
Multiplicity	[0..1]
Description	Collection of needs and preferences for a method to use at the end of a *code* for variable-length codes.

6.19.5 'Switch Port' Attribute Description

Table 6.165 Description of the 'switch port' attribute for the Coded_Input class.

Descriptor	Definition
Attribute name	switch port
Data type	Enumerated vocabulary: Switch_Port_Vocabulary
Value space	The enumerated vocabulary is: { ps/2 | game | serial | usb | firewire | infrared | bluetooth }. Default=usb.
Multiplicity	[1]
Description	Port to be used by a *switch* input. The value space for this vocabulary is approved by IMS GLC. The syntax and semantics of the approved list of terms shall be supported by all software components implementing this Information Model. The value space for the vocabulary may be extended. Such extensions may be created and used only when no approved IMS GLC value satisfies the expressive need of an implementing community to define the shape of a collection.

6.19.6 'Custom Code' Attribute Description

Table 6.166 Description of the 'custom code' attribute for the Coded_Input class.

Descriptor	Definition
Attribute name	custom code
Data type	URI
Value space	See Table 6.1.
Multiplicity	[0..1]
Description	Data element identifying an external document containing a specification of a custom *code* scheme.

6.19.7 'Application' Attribute Description

Table 6.167 Description of the 'application' attribute for the Coded_Input class.

Descriptor	Definition
Attribute name	application
Data type	Application
Value space	Container
Multiplicity	[0..unbounded], unordered
Description	Collection of needs and preferences for how to configure vendor-specific parameters of assistive technology.

6.19.8 'Extension' Attribute Description

Table 6.168 Description of the 'extension' attribute for the Coded_Input class.

Descriptor	Definition
Attribute name	extension
Data type	Unspecified
Value space	Defined in terms of how the Information Model is realized by a binding.
Multiplicity	[0..unbounded], unordered
Description	This is a placeholder. It informs bindings of this Information Model as to the valid locations for the inclusion that extend the parent class.

6.20 Prediction Class Description

The PIM for the Prediction data model is shown in Figure 6.19.

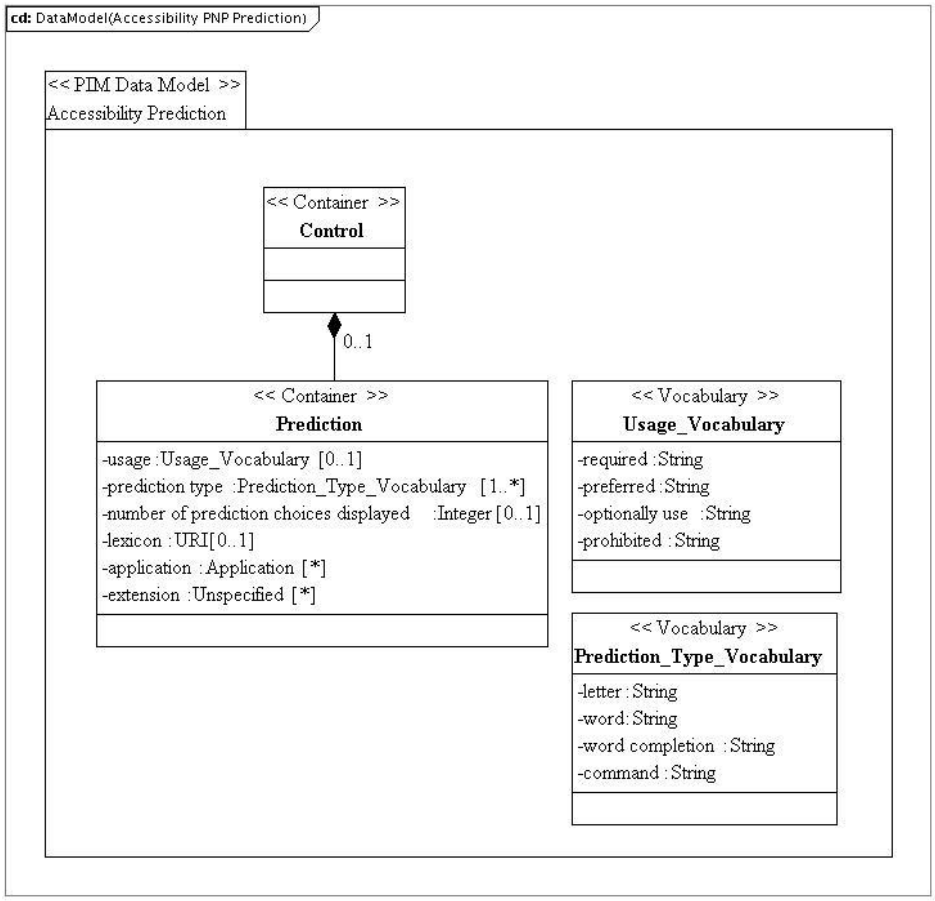


Figure 6.19 — Prediction class diagram.

Table 6.169 Description of the 'Prediction' class.

Descriptor	Definition
Class name	Prediction
Class type	Container
Parents	Control
Children	[usage, prediction type, number of prediction choices displayed, lexicon, application, extension], unordered
Description	Collection of data element that state needs and preferences for how to configure a *prediction system*.

6.20.1 'Usage' Attribute Description

Table 6.170 Description of the 'usage' attribute for the Prediction class.

Descriptor	Definition
Attribute name	usage
Data type	Enumerated vocabulary: Usage_Vocabulary
Value space	The enumerated vocabulary is: { required | preferred | optionally use | prohibited }. Default=preferred.
Multiplicity	[0..1]
Description	Rating for the collection of AfA needs and preferences. The value space for this vocabulary is approved by IMS GLC. The syntax and semantics of the approved list of terms shall be supported by all software components implementing this Information Model. The value space for the vocabulary may be extended. Such extensions may be created and used only when no approved IMS GLC value satisfies the expressive need of an implementing community to define the shape of a collection.

6.20.2 'Prediction Type' Attribute Description

Table 6.171 Description of the 'prediction type' attribute for the Prediction class.

Descriptor	Definition
Attribute name	prediction type
Data type	Enumerated vocabulary: Prediction_Type_Vocabulary
Value space	The enumerated vocabulary is: { letter | word | word completion | command }. Default=word completion.
Multiplicity	[1..unbounded], unordered
Description	Type of prediction to use. The value space for this vocabulary is approved by IMS GLC. The syntax and semantics of the approved list of terms shall be supported by all software components implementing this Information Model. The value space for the vocabulary may be extended. Such extensions may be created and used only when no approved IMS GLC value satisfies the expressive need of an implementing community to define the shape of a collection.

6.20.3 'Number of Prediction Choices Displayed' Attribute Description

Table 6.172 Description of the 'number of prediction choices displayed' attribute for the Prediction class.

Descriptor	Definition
Attribute name	number of prediction choices displayed
Data type	Integer
Value space	1 ≤ number of prediction choices displayed. Default=5.
Multiplicity	[0..1]
Description	Number of predicted elements to display.

6.20.4 'Lexicon' Attribute Description

Table 6.173 Description of the 'lexicon' attribute for the Prediction class.

Descriptor	Definition
Attribute name	lexicon
Data type	URI
Value space	See Table 6.1.
Multiplicity	[0..1]
Description	A data element identifying an external user defined *lexicon* file.

6.20.5 'Application' Attribute Description

Table 6.174 Description of the 'application' attribute for the Prediction class.

Descriptor	Definition
Attribute name	application
Data type	Application
Value space	Container
Multiplicity	[0..unbounded], unordered
Description	Collection of needs and preferences for how to configure vendor-specific parameters of assistive technology.

6.20.6 'Extension' Attribute Description

Table 6.175 Description of the 'extension' attribute for the Prediction class.

Descriptor	Definition
Attribute name	extension
Data type	Unspecified
Value space	Defined in terms of how the Information Model is realized by a binding.
Multiplicity	[0..unbounded], unordered
Description	This is a placeholder. It informs bindings of this Information Model as to the valid locations for the inclusion that extend the parent class.

6.21 Structural_Navigation Class Description

The PIM for the Structural_Navigation data model is shown in Figure 6.20.

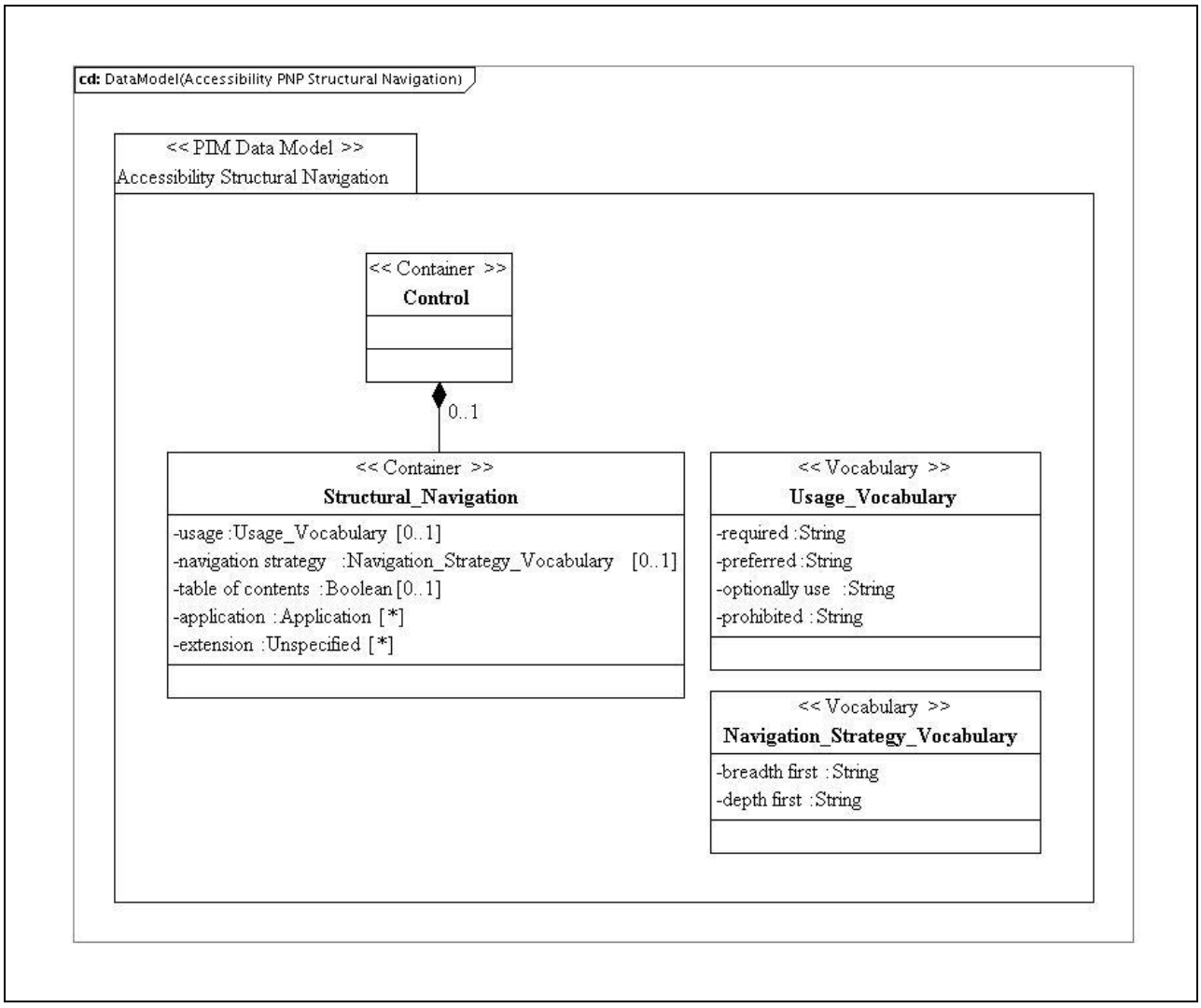


Figure 6.20 — Structural_Navigation class diagram.

Table 6.176 Description of the 'Structural_Navigation' class.

Descriptor	Definition
Class name	Structural_Navigation
Class type	Container
Parents	Control
Children	[usage, navigation strategy, tale of contents, application, extension], unordered
Description	Collection of needs and preferences for how to move through content using the structure of the content.

6.21.1 'Usage' Attribute Description

Table 6.177 Description of the 'usage' attribute for the Structural_Navigation class.

Descriptor	Definition
Attribute name	usage
Data type	Enumerated vocabulary: Usage_Vocabulary
Value space	The enumerated vocabulary is: { required | preferred | optionally use | prohibited }. Default=preferred.
Multiplicity	[0..1]
Description	Rating for the collection of AfA needs and preferences. The value space for this vocabulary is approved by IMS GLC. The syntax and semantics of the approved list of terms shall be supported by all software components implementing this Information Model. The value space for the vocabulary may be extended. Such extensions may be created and used only when no approved IMS GLC value satisfies the expressive need of an implementing community to define the shape of a collection.

6.21.2 'Navigation Strategy' Attribute Description

Table 6.178 Description of the 'navigation strategy' attribute for the Structural_Navigation class.

Descriptor	Definition
Attribute name	navigation strategy
Data type	Enumerated vocabulary: Navigation_Strategy_Vocabulary
Value space	The enumerated vocabulary is: { breadth first | depth first }. Default=depth first.
Multiplicity	[0..1]
Description	How focus should move through a navigation structure. The value space for this vocabulary is approved by IMS GLC. The syntax and semantics of the approved list of terms shall be supported by all software components implementing this Information Model. The value space for the vocabulary may be extended. Such extensions may be created and used only when no approved IMS GLC value satisfies the expressive need of an implementing community to define the shape of a collection.

6.21.3 'Table of Contents' Attribute Description

Table 6.179 Description of the 'table of contents' attribute for the Structural_Navigation class.

Descriptor	Definition
Attribute name	table of contents
Data type	Boolean
Value space	Enumerated as: { true | false }. Default=true.
Multiplicity	[0..1]
Description	Preference to use a table of contents for navigation.

6.21.4 'Application' Attribute Description

Table 6.180 Description of the 'application' attribute for the Structural_Navigation class.

Descriptor	Definition
Attribute name	application
Data type	Application
Value space	Container
Multiplicity	[0..unbounded], unordered
Description	Collection of needs and preferences for how to configure vendor-specific parameters of assistive technology.

6.21.5 'Extension' Attribute Description

Table 6.181 Description of the 'extension' attribute for the Structural_Navigation class.

Descriptor	Definition
Attribute name	extension
Data type	Unspecified
Value space	Defined in terms of how the Information Model is realized by a binding.
Multiplicity	[0..unbounded], unordered
Description	This is a placeholder. It informs bindings of this Information Model as to the valid locations for the inclusion that extend the parent class.

6.22 Sticky_Keys Class Description

The PIM for the Sticky_Keys data model is shown in Figure 6.21.

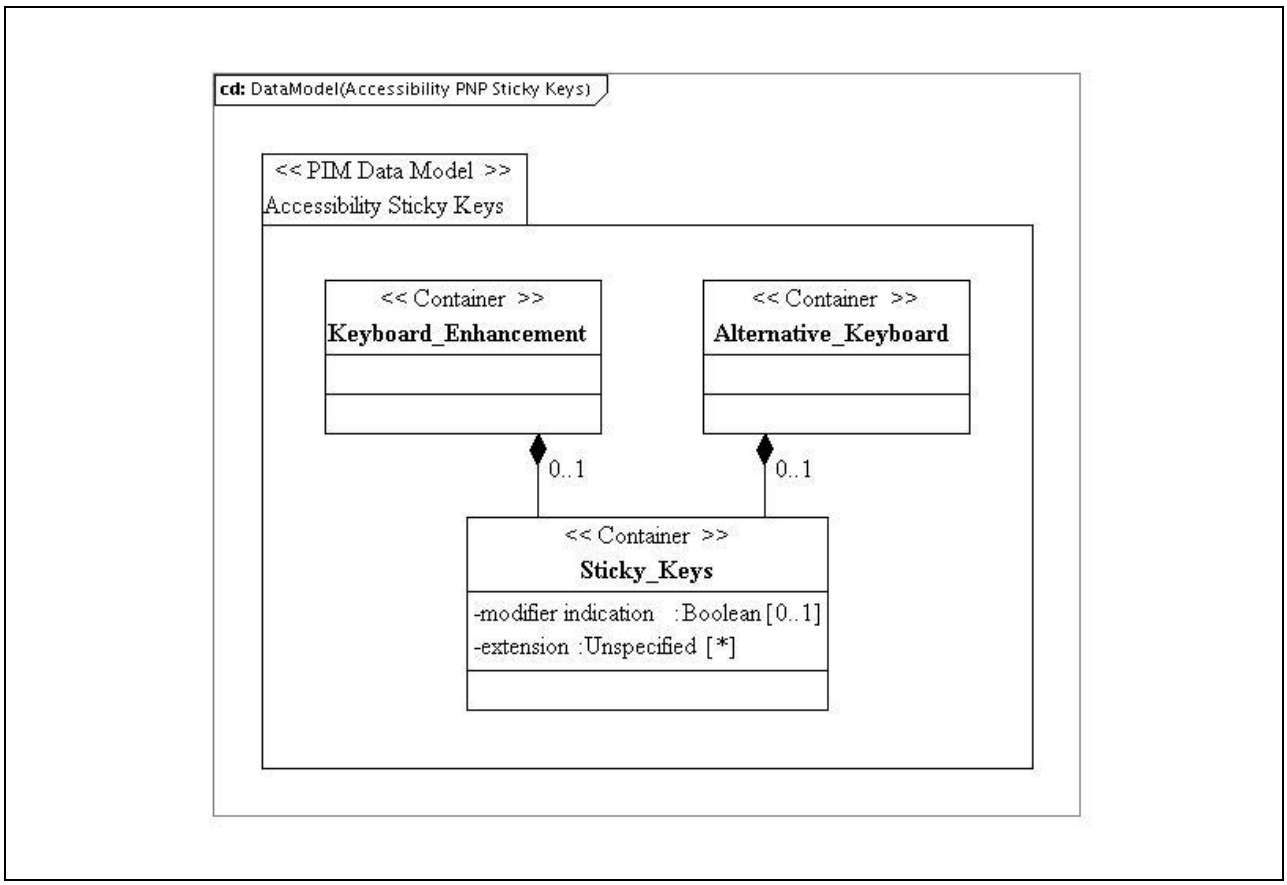


Figure 6.21 — Sticky_Keys class diagram.

Table 6.182 Description of the 'Sticky_Keys' class.

Descriptor	Definition
Class name	Sticky_Keys
Class type	Container
Parents	Keyboard_Enhancement, Alternative_Keyboard
Children	[modifier indication, extension], unordered
Description	Collection of needs and preferences for the use of *sticky keys*.

6.22.1 'Modifier Indication' Attribute Description

Table 6.183 Description of the 'modifier indication' attribute for the Sticky_Keys class.

Descriptor	Definition
Attribute name	Modifier indication
Data type	Boolean
Value space	Enumerated as: { true | false }. Default=true.
Multiplicity	[0..1]
Description	Preference to play a sound when a modifier key is pressed.

6.22.2 'Extension' Attribute Description

Table 6.184 Description of the 'extension' attribute for the Sticky_Keys class.

Descriptor	Definition
Attribute name	extension
Data type	Unspecified
Value space	Defined in terms of how the Information Model is realized by a binding.
Multiplicity	[0..unbounded], unordered
Description	This is a placeholder. It informs bindings of this Information Model as to the valid locations for the inclusion that extend the parent class.

6.23 Repeat_Keys Class Description

The PIM for the Repeat_Keys data model is shown in Figure 6.22.

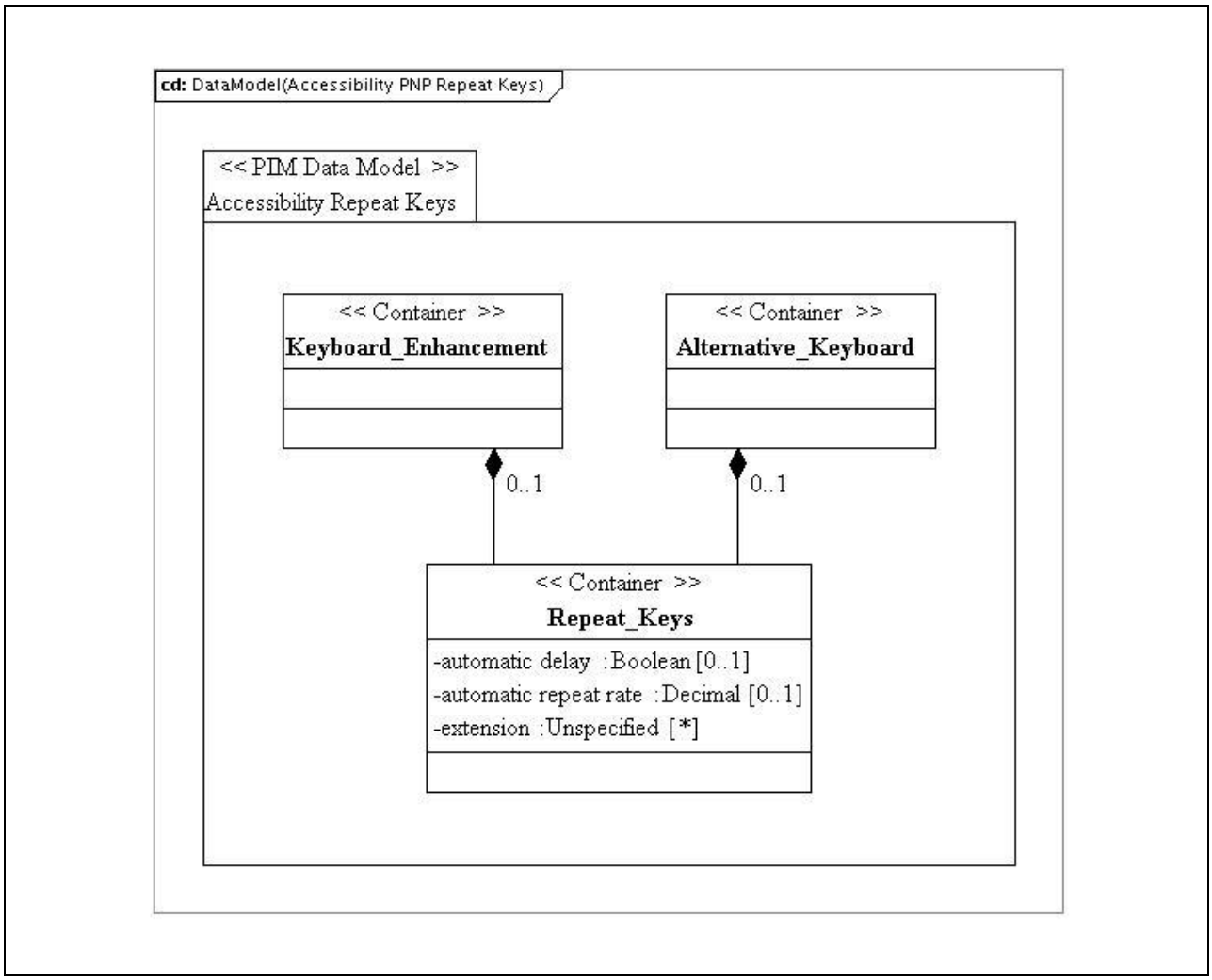


Figure 6.22 — Repeat_Keys class diagram.

Table 6.185 Description of the 'Repeat_Keys' class.

Descriptor	Definition
Class name	Repeat_Keys
Class type	Container
Parents	Keyboard_Enhancement, Alternative_Keyboard
Children	[automatic delay, automatic repeat rate, extension], unordered
Description	Collection of needs and preferences for the use of *repeat keys*.

6.23.1 'Automatic Delay' Attribute Description

Table 6.186 Description of the 'automatic delay' attribute for the Repeat_Keys class.

Descriptor	Definition
Attribute name	automatic delay
Data type	Boolean
Value space	Enumerated as: { true | false}. Default=true.
Multiplicity	[0..1]
Description	Time that a system using *repeat keys* should wait before *auto-repeat* engages.

6.23.2 'Automatic Repeat Rate' Attribute Description

Table 6.186 Description of the 'automatic repeat rate' attribute for the Repeat_Keys class.

Descriptor	Definition
Attribute name	automatic repeat rate
Data type	Decimal (10, 4)
Value space	0.0 ≤ automatic repeat rate ≤ 1.0. Default=0.5.
Multiplicity	[0..1]
Description	Rate at which keys should be repeated when *repeat keys* is being used. NOTE Use 0.0 = "short", 0.5 = "medium", 1.0 = "long".

6.23.3 'Extension' Attribute Description

Table 6.187 Description of the 'extension' attribute for the Repeat_Keys class.

Descriptor	Definition
Attribute name	extension
Data type	Unspecified
Value space	Defined in terms of how the Information Model is realized by a binding.
Multiplicity	[0..unbounded], unordered
Description	This is a placeholder. It informs bindings of this Information Model as to the valid locations for the inclusion that extend the parent class.

6.24 Slow_Keys Class Description

The PIM for the Slow_Keys data model is shown in Figure 6.23.

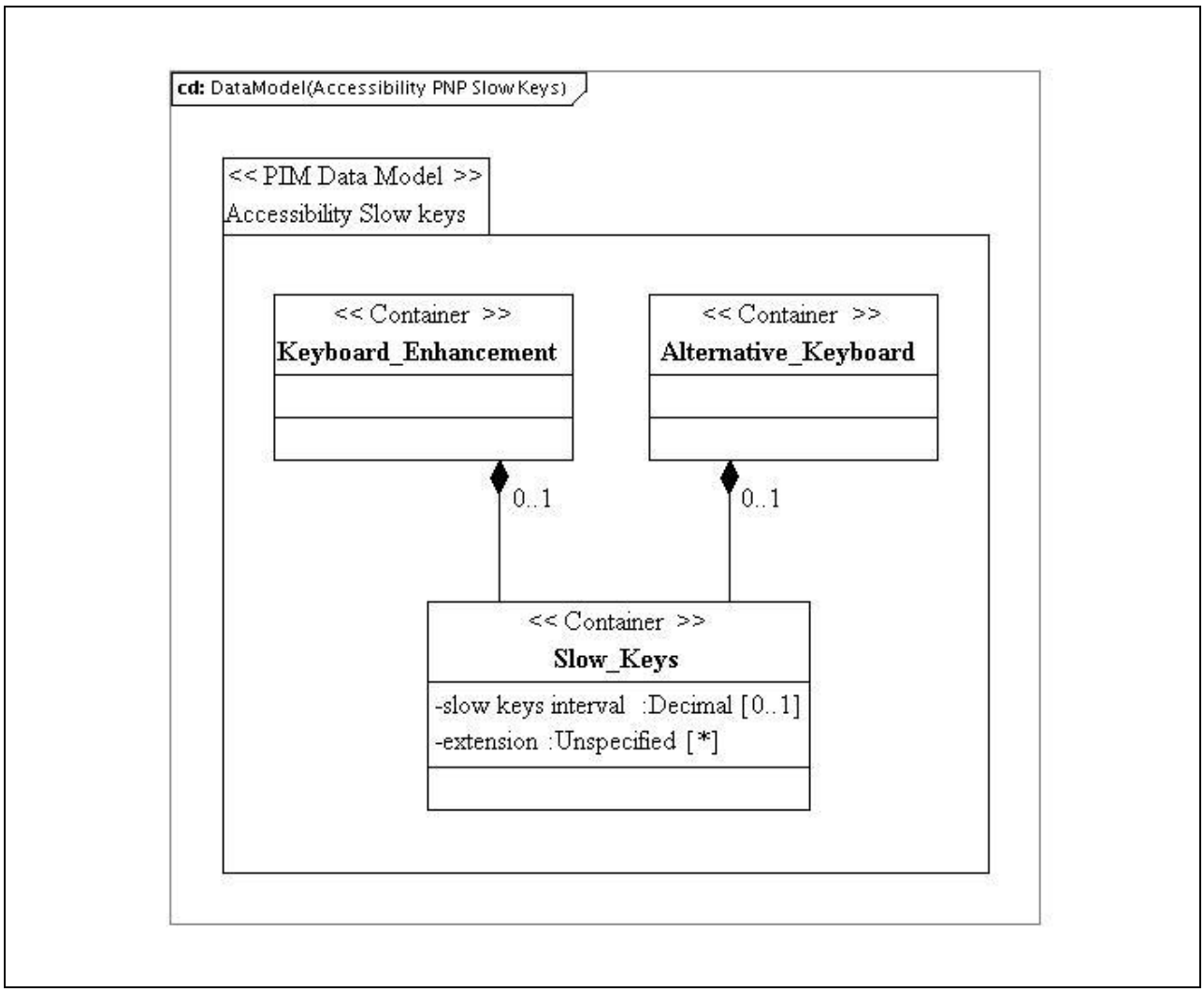


Figure 6.23 — Slow_Keys class diagram.

Table 6.188 Description of the 'Slow_Keys' class.

Descriptor	Definition
Class name	Slow_keys
Class type	Container
Parents	Keyboard_Enhancement, Alternative_Keyboard
Children	[slow keys interval, extension], unordered
Description	Collection of needs and preferences for the use of *slow keys*.

6.24.1 'Slow Keys Interval' Attribute Description

Table 6.189 Description of the 'slow keys interval' attribute for the Slow_Keys class.

Descriptor	Definition
Attribute name	slow keys interval
Data type	Decimal (10, 4)
Value space	0.0 ≤ slow keys interval ≤ 1.0. Default=0.2.
Multiplicity	[0..1]
Description	Interval before a key press is detected when *slow keys* is being used . NOTE: Use 0.0 = "slow", 0.5 = "medium", 1.0 = "fast".

6.24.2 'Extension' Attribute Description

Table 6.190 Description of the 'extension' attribute for the Slow_Keys class.

Descriptor	Definition
Attribute name	extension
Data type	Unspecified
Value space	Defined in terms of how the Information Model is realized by a binding.
Multiplicity	[0..unbounded], unordered
Description	This is a placeholder. It informs bindings of this Information Model as to the valid locations for the inclusion that extend the parent class.

6.25 Debounce Class Description

The PIM for the Debounce data model is shown in Figure 6.24.

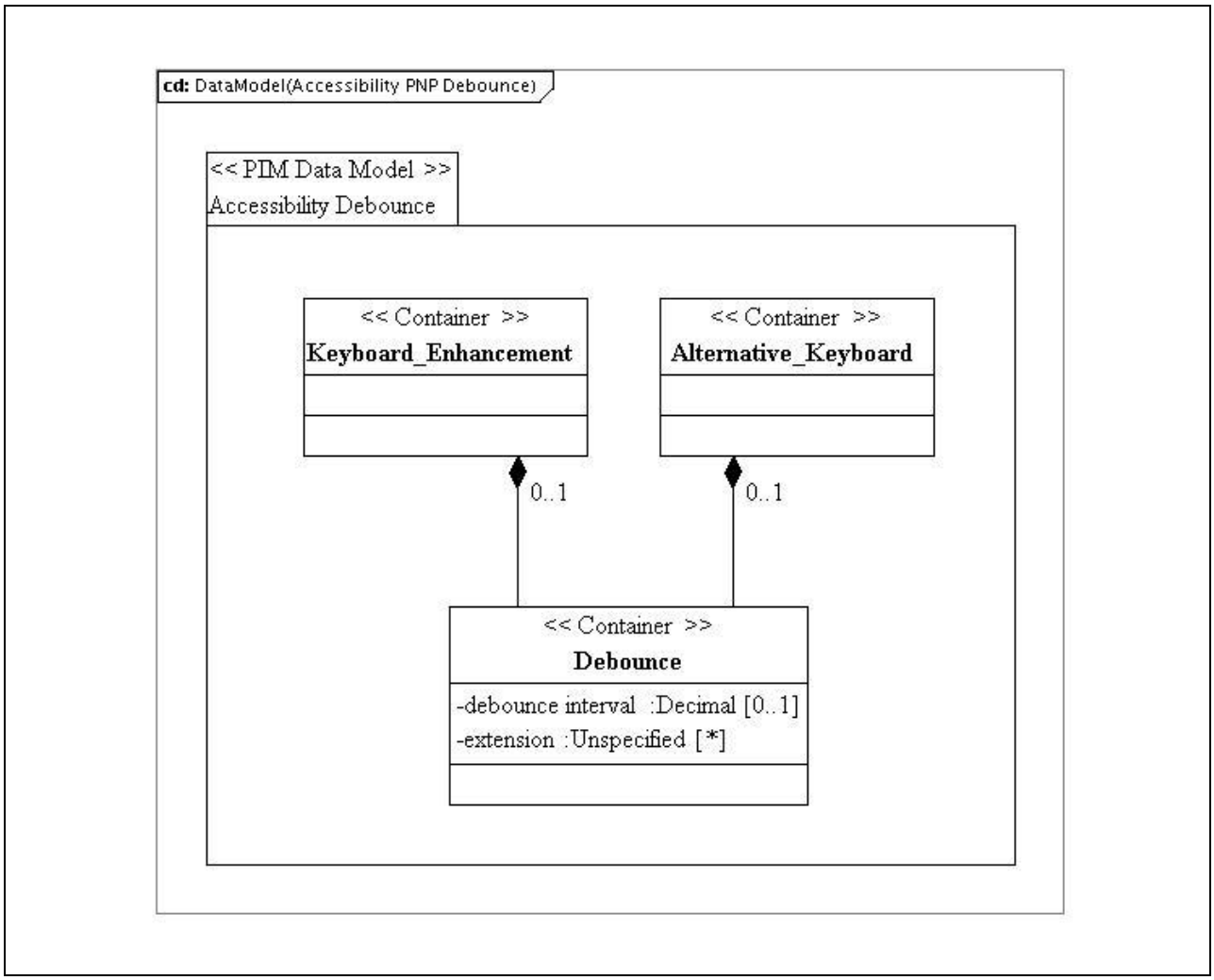


Figure 6.24 — Debounce class diagram.

Table 6.191 Description of the 'Debounce' class.

Descriptor	Definition
Class name	Debounce
Class type	Container
Parents	Keyboard_Enhancement, Alternative_Keyboard
Children	[debounce interval, extension], unordered
Description	Collection of needs and preferences for the use of *debounce*.

6.25.1 'Debounce Interval' Attribute Description

Table 6.192 Description of the 'debounce interval' attribute for the Debounce class.

Descriptor	Definition
Attribute name	debounce interval
Data type	Decimal (10, 4)
Value space	0.0 ≤ debounce interval ≤ 1.0. Default=0.5.
Multiplicity	[0..1]
Description	Interval, in seconds, repeated keystrokes presses of the same character key are ignored when *debounce* is being used. NOTE This value is in seconds.

6.25.2 'Extension' Attribute Description

Table 6.193 Description of the 'extension' attribute for the Debounce class.

Descriptor	Definition
Attribute name	extension
Data type	Unspecified
Value space	Defined in terms of how the Information Model is realized by a binding.
Multiplicity	[0..unbounded], unordered
Description	This is a placeholder. It informs bindings of this Information Model as to the valid locations for the inclusion that extend the parent class.

6.26 Point_and_Click_Selection Class Description

The PIM for the Point_and_Click_Selection data model is shown in Figure 6.25.

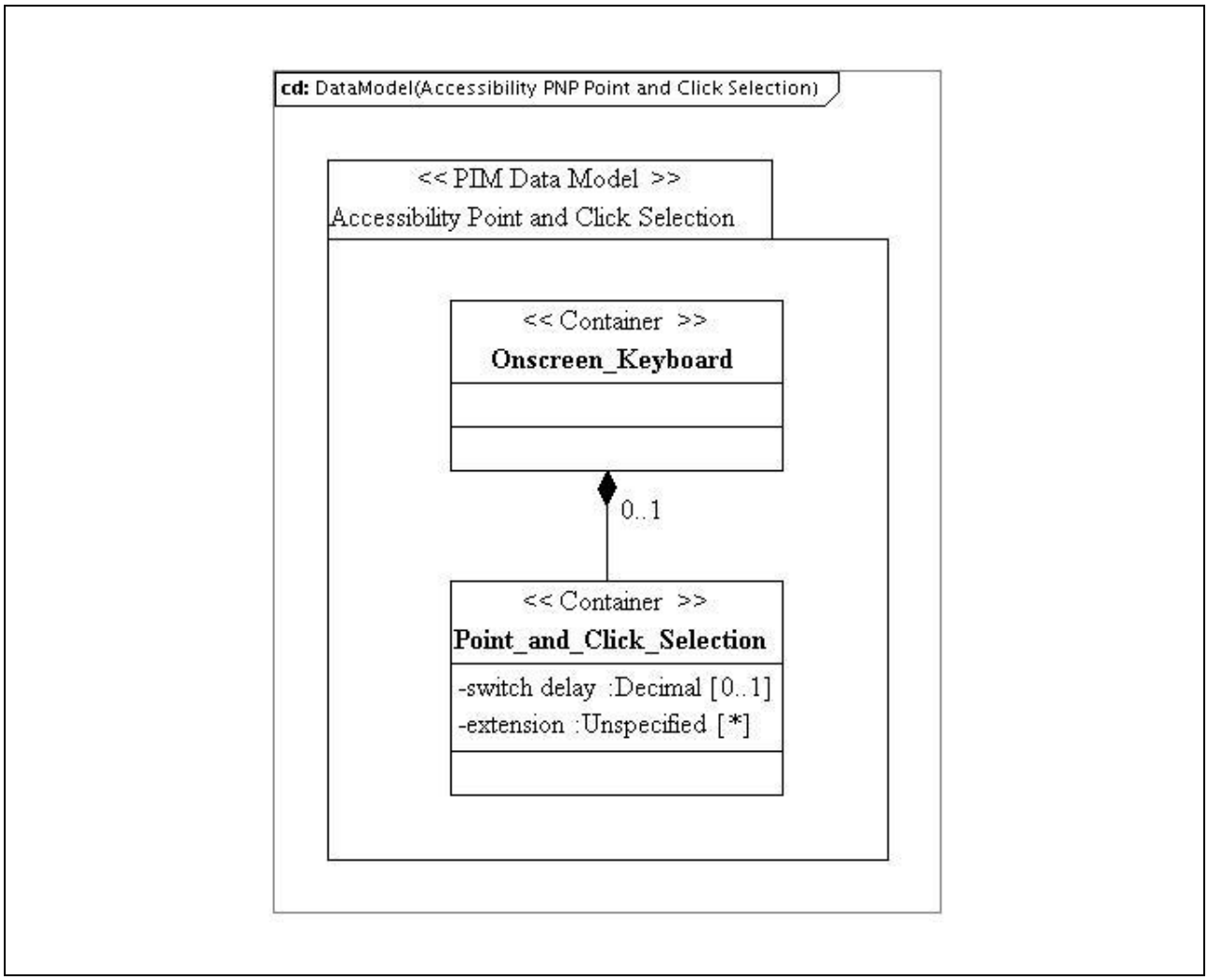


Figure 6.25 — Point_and_Click_Selection class diagram.

Table 6.194 Description of the 'Point_and_Click_Selection' class.

Descriptor	Definition
Class name	Point_and_Click_Selection
Class type	Container
Parents	Onscreen_Keyboard
Children	[switch delay, extension], unordered
Description	Collection of needs and preferences for the use of a *point-and-click* interface.

6.26.1 'Switch Delay' Attribute Description

Table 6.195 Description of the 'switch delay' attribute for the Point_and_Click_Selection class.

Descriptor	Definition
Attribute name	switch delay
Data type	Decimal (10, 4)
Value space	0.0 ≤ switch delay. Default=0.0.
Multiplicity	[0..1]
Description	Delay in seconds before recognizing a *switch* press. NOTE This value is in seconds.

6.26.2 'Extension' Attribute Description

Table 6.196 Description of the 'extension' attribute for the Point_and_Click_Selection class.

Descriptor	Definition
Attribute name	extension
Data type	Unspecified
Value space	Defined in terms of how the Information Model is realized by a binding.
Multiplicity	[0..unbounded], unordered
Description	This is a placeholder. It informs bindings of this Information Model as to the valid locations for the inclusion that extend the parent class.

6.27 Point_and_Dwell_Selection Class Description

The PIM for the Point_and_Dwell_Selection data model is shown in Figure 6.26.

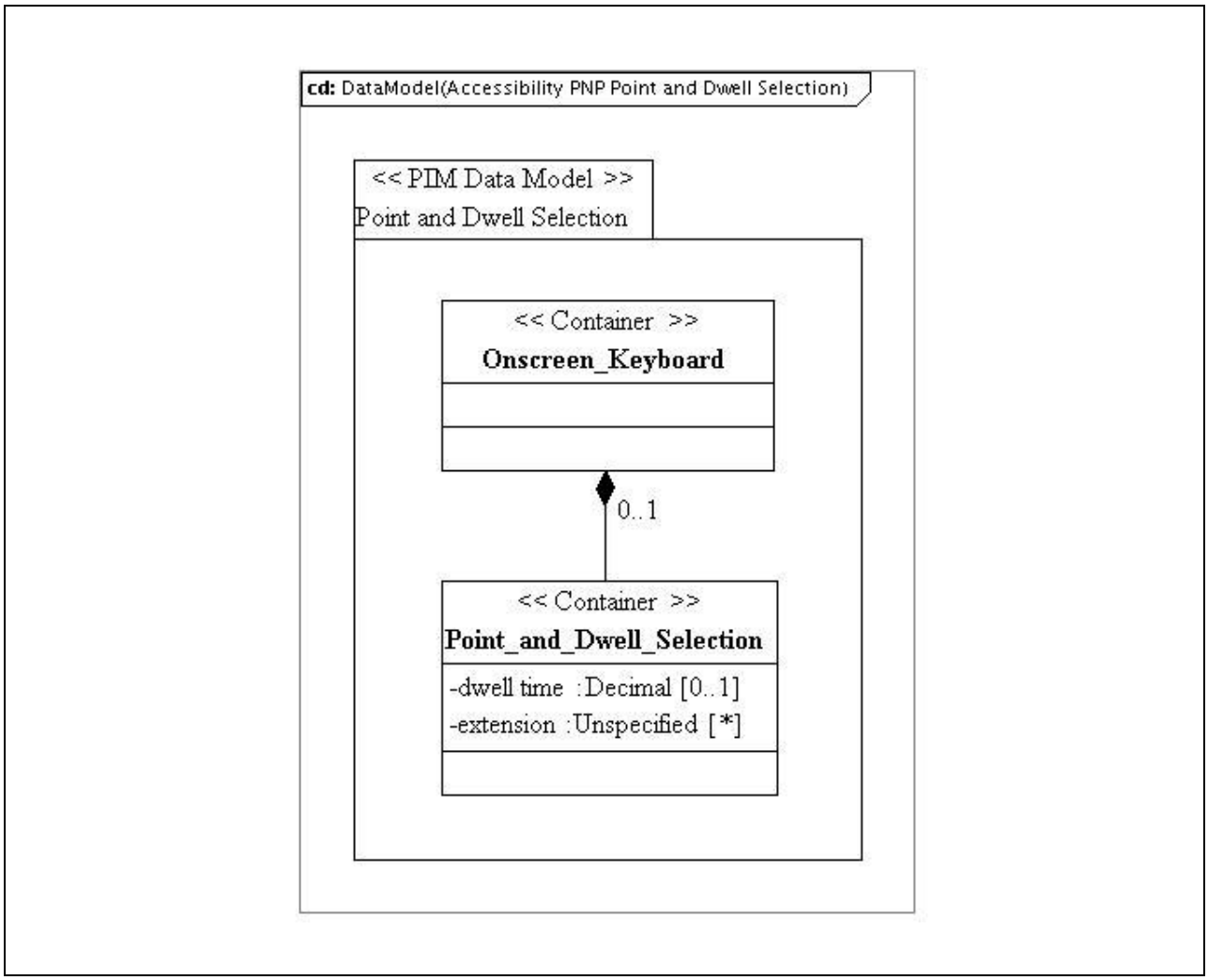


Figure 6.26 — Point_and_Dwell_Selection class diagram.

Table 6.197 Description of the 'Point_and_Dwell_Selection' class.

Descriptor	Definition
Class name	Point_and_Dwell_Selection
Class type	Container
Parents	Onscreen_Keyboard
Children	[dwell time, extension], unordered
Description	Collection of needs and preferences for the use of a *point-and-dwell* interface.

6.27.1 'Dwell Time' Attribute Description

Table 6.198 Description of the 'dwell time' attribute for the Point_and_Dwell_Selection class.

Descriptor	Definition
Attribute name	dwell time
Data type	Decimal (10, 4)
Value space	0.0 < dwell time. Default=0.5.
Multiplicity	[0..1]
Description	Time in seconds to dwell in order to deem that a selection has been made when *point-and-dwell* is being used. NOTE This value is in seconds.

6.27.2 'Extension' Attribute Description

Table 6.199 Description of the 'extension' attribute for the Point_and_Dwell_Selection class.

Descriptor	Definition
Attribute name	extension
Data type	Unspecified
Value space	Defined in terms of how the Information Model is realized by a binding.
Multiplicity	[0..unbounded], unordered
Description	This is a placeholder. It informs bindings of this Information Model as to the valid locations for the inclusion that extend the parent class.

6.28 Automatic_Scanning Class Description

The PIM for the Automatic Scanning data model is shown in Figure 6.27.

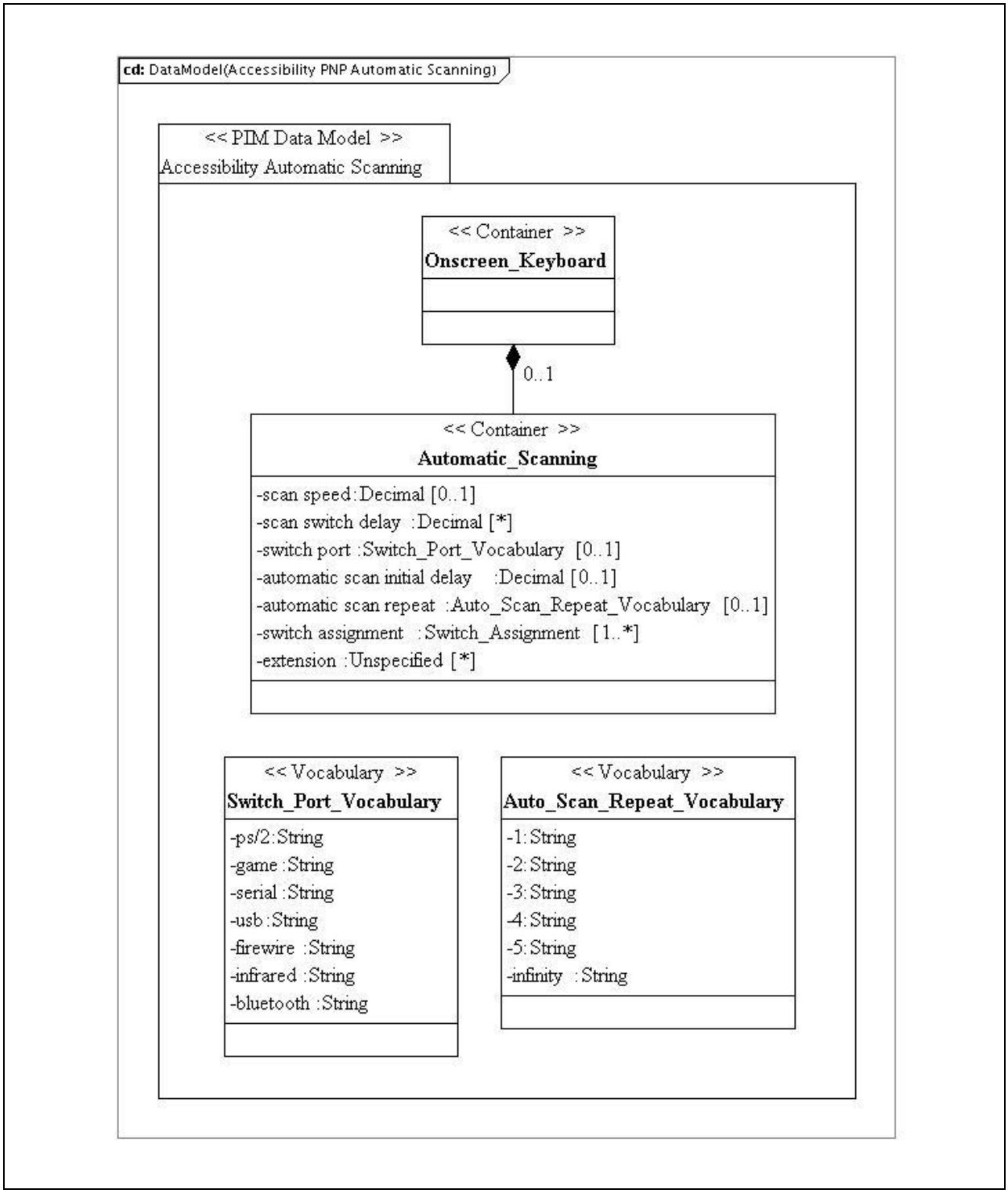


Figure 6.27 — Automatic_Scanning class diagram.

Table 6.200 Description of the 'Automatic_Scanning' class.

Descriptor	Definition
Class name	Automatic_Scanning
Class type	Container
Parents	Onboard_Keyboard
Children	[scan speed, scan switch delay, switch port, automatic scan initial delay, automatic scan repeat, switch assignment, extension], unordered
Description	Collection of needs and preferences for the use of an *automatic scanning interface*.

6.28.1 'Scan Speed' Attribute Description

Table 6.201 Description of the 'scan speed' attribute for the Automatic_Scanning class.

Descriptor	Definition
Attribute name	scan speed
Data type	Decimal (10, 4)
Value space	0.0 < scan speed. Default=1.0.
Multiplicity	[0..1]
Description	*Scanning* speed, in seconds, before a system moves on to the next item or row. NOTE 1: The scan speed may not be less than the scan switch delay. NOTE 2: This value is in seconds.

6.28.2 'Scan Switch Delay' Attribute Description

Table 6.202 Description of the 'scan switch delay' attribute for the Automatic_Scanning class.

Descriptor	Definition
Attribute name	scan switch delay
Data type	Decimal (10, 4)
Value space	0.0 ≤ scan switch delay. Default=0.0.
Multiplicity	[0..unbounded], unordered
Description	Delay, in seconds, before a *switch* activation is recognized. NOTE This value is in seconds.

6.28.3 'Switch Port' Attribute Description

Table 6.203 Description of the 'switch port' attribute for the Automatic_Scanning class.

Descriptor	Definition
Attribute name	Switch port
Data type	Enumerated vocabulary: Switch_Port_Vocabulary
Value space	The enumerated vocabulary is: { ps/2 | game | serial | usb | firewire | infrared | bluetooth }. Default=usb.
Multiplicity	[0..1]
Description	Port used by a switch input. The value space for this vocabulary is approved by IMS GLC. The syntax and semantics of the approved list of terms shall be supported by all software components implementing this Information Model. The value space for the vocabulary may be extended. Such extensions may be created and used only when no approved IMS GLC value satisfies the expressive need of an implementing community to define the shape of a collection.

6.28.4 'Automatic Scan Initial Delay' Attribute Description

Table 6.204 Description of the 'automatic scan initial delay' attribute for the Automatic_Scanning class.

Descriptor	Definition
Attribute name	automatic scan initial delay
Data type	Decimal (10, 4)
Value space	0.0 ≤ automatic scan initial delay. Default=0.0.
Multiplicity	[0..1]
Description	Delay, in seconds, after a *switch* activation is recognized before a *scan* is initiated. NOTE This value is in seconds.

6.28.5 'Automatic Scan Repeat' Attribute Description

Table 6.205 Description of the 'automatic scan repeat' attribute for Automatic_Scanning class.

Descriptor	Definition
Attribute name	automatic scan repeat
Data type	Enumerated vocabulary: Auto_Scan_Repeat_Vocabulary
Value space	The enumerated vocabulary is: { 1 | 2 | 3 | 4 | 5 | infinity }. Default=1.
Multiplicity	[0..1]
Description	Number of times an *automatic scanning interface* should repeat a row before escaping to a higher level and continuing a *scan*. The value space for this vocabulary is approved by IMS GLC. The syntax and semantics of the approved list of terms shall be supported by all software components implementing this Information Model. The value space for the vocabulary may be extended. Such extensions may be created and used only when no approved IMS GLC value satisfies the expressive need of an implementing community to define the shape of a collection.

6.28.6 'Switch Assignment' Attribute Description

Table 6.206 Description of the 'switch assignment' attribute for the Automatic_Scanning class.

Descriptor	Definition
Attribute name	switch assignment
Data type	Switch_Assignment
Value space	Container
Multiplicity	[1..unbounded], unordered
Description	Collection of data elements that states a preference for an assigned function of a numbered *switch*.

6.28.7 'Extension' Attribute Description

Table 6.207 Description of the 'extension' attribute for the Automatic_Scanning class.

Descriptor	Definition
Attribute name	extension
Data type	Unspecified
Value space	Defined in terms of how the Information Model is realized by a binding.
Multiplicity	[0..unbounded], unordered
Description	This is a placeholder. It informs bindings of this Information Model as to the valid locations for the inclusion that extend the parent class.

6.29 Inverse_Scanning Class Description

The PIM for the Inverse Scanning data model is shown in Figure 6.28.

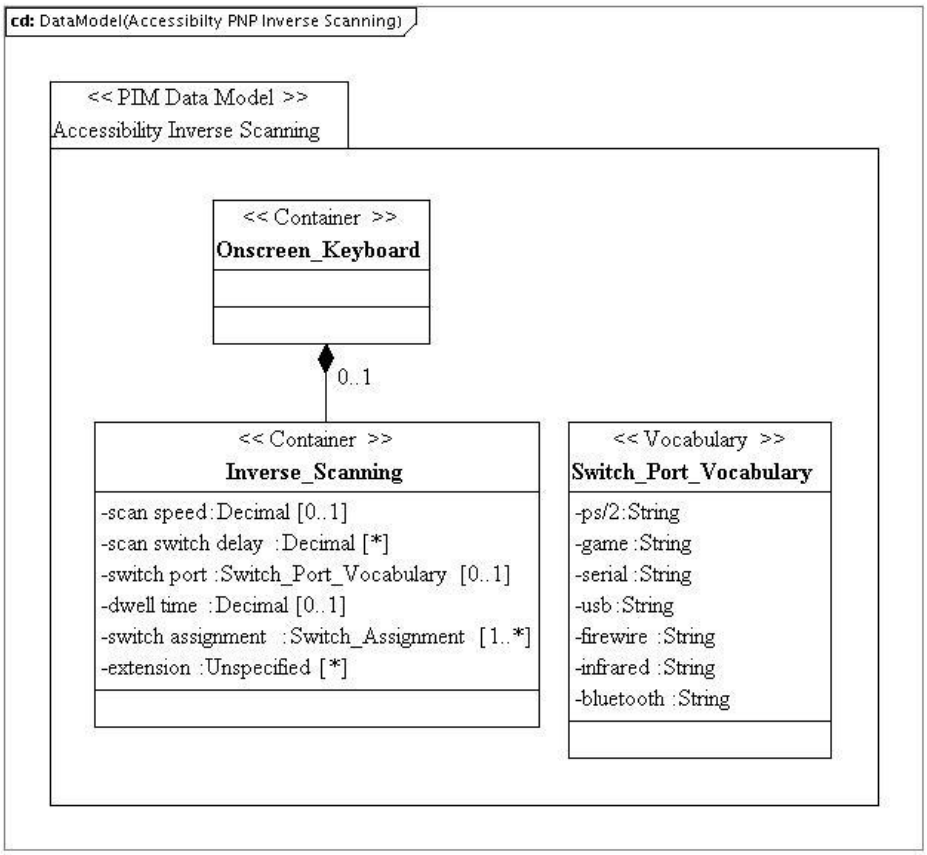


Figure 6.28 — Inverse_Scanning class diagram.

Table 6.208 Description of the 'Inverse_Scanning' class.

Descriptor	Definition
Class name	Inverse_Scanning
Class type	Container
Parents	Onscreen_Keyboard
Children	[scan speed, scan switch delay, switch port, dwell time, switch assignment, extension], unordered
Description	Collection of needs and preferences for the use of an *inverse scanning interface*.

6.29.1 'Scan Speed' Attribute Description

Table 6.209 Description of the 'scan speed' attribute for the Inverse_Scanning class.

Descriptor	Definition
Attribute name	scan speed
Data type	Decimal (10, 4)
Value space	0.0 < scan speed. Default=1.0.
Multiplicity	[0..1]
Description	*Scanning* speed, in seconds, before a system moves on to the next item or row. NOTE 1: The scan speed may not be less than scan switch delay. NOTE 2: This value is in seconds.

6.29.2 'Scan Switch Delay' Attribute Description

Table 6.210 Description of the 'scan switch delay' attribute for the Inverse_Scanning class.

Descriptor	Definition
Attribute name	scan switch delay
Data type	Decimal (10, 4)
Value space	0.0 ≤ scan switch delay. Default=0.0.
Multiplicity	[0..unbounded], unordered
Description	Delay, in seconds, before a *switch* activation is recognized. NOTE This value is in seconds.

6.29.3 'Switch Support' Attribute Description

Table 6.211 Description of the 'switch support' attribute for the Inverse_Scanning class.

Descriptor	Definition
Attribute name	Switch port
Data type	Enumerated vocabulary: Switch_Port_Vocabulary
Value space	The enumerated vocabulary is: { ps/2 | game | serial | usb | firewire | infrared | bluetooth }. Default=usb.
Multiplicity	[0..1]
Description	Port used by a switch input. The value space for this vocabulary is approved by IMS GLC. The syntax and semantics of the approved list of terms shall be supported by all software components implementing this Information Model. The value space for the vocabulary may be extended. Such extensions may be created and used only when no approved IMS GLC value satisfies the expressive need of an implementing community to define the shape of a collection.

6.29.4 'Dwell Time' Attribute Description

Table 6.212 Description of the 'dwell time' attribute for the Inverse_Scanning class.

Descriptor	Definition
Attribute name	dwell time
Data type	Decimal (10, 4)
Value space	0.0 < dwell time. Default=0.5.
Multiplicity	[0..1]
Description	Time in seconds to dwell in order to deem that a selection has been made when *point-and-dwell* is being used. NOTE: This value is in seconds.

6.29.5 'Switch Assignment' Attribute Description

Table 6.213 Description of the 'switch assignment' attribute for the Inverse_Scanning class.

Descriptor	Definition
Attribute name	switch assignment
Data type	Switch_Assignment
Value space	Container
Multiplicity	[1..unbounded], unordered
Description	Collection of data elements that states a preference for an assigned function of a numbered *switch*.

6.29.6 'Extension' Attribute Description

Table 6.214 Description of the 'extension' attribute for the Inverse_Scanning class.

Descriptor	Definition
Attribute name	extension
Data type	Unspecified
Value space	Defined in terms of how the Information Model is realized by a binding.
Multiplicity	[0..unbounded], unordered
Description	This is a placeholder. It informs bindings of this Information Model as to the valid locations for the inclusion that extend the parent class.

6.30 Directed_Scanning Class Description

The PIM for the Directed Scanning data model is shown in Figure 6.29.

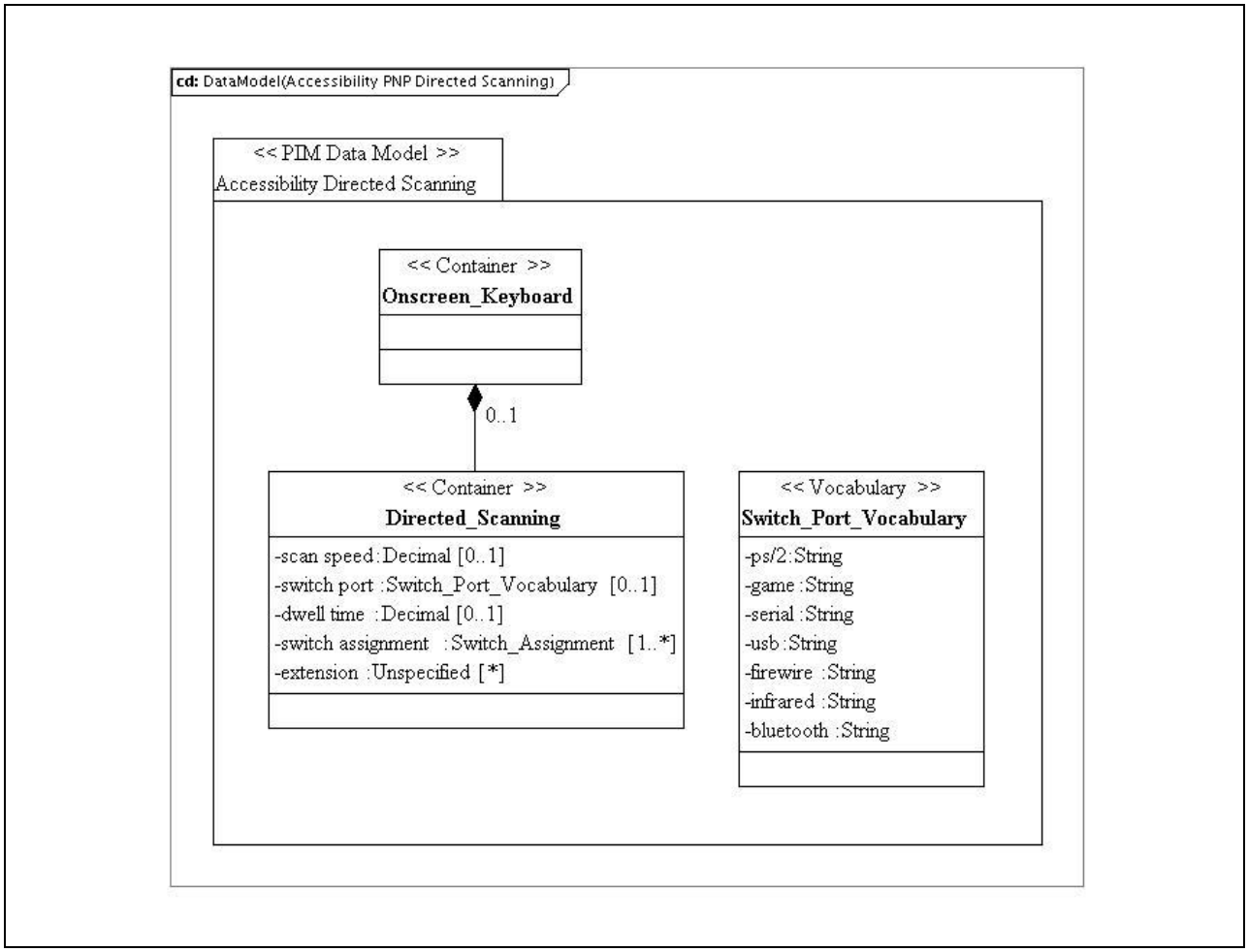


Figure 6.29 — Directed_Scanning class diagram.

Table 6.215 Description of the 'Directed_Scanning' class.

Descriptor	Definition
Class name	Directed_Scanning
Class type	Container
Parents	Onscreen_Keyboard
Children	[scan speed, switch port, dwell time, switch assignment, extension], unordered
Description	Collection of needs and preferences for the use of a *directed scanning interface*.

6.30.1 'Scan Speed' Attribute Description

Table 6.216 Description of the 'scan speed' attribute for the Directed_Scanning class.

Descriptor	Definition
Attribute name	scan speed
Data type	Decimal (10, 4)
Value space	0.0 < scan speed. Default=1.0.
Multiplicity	[0..1]
Description	*Scanning* speed, in seconds, before a system moves on to the next item or row. NOTE 1: The scan speed may not be less than scan switch delay. NOTE 2: This value is in seconds.

6.30.2 'Switch Support' Attribute Description

Table 6.217 Description of the 'switch support' attribute for the Directed_Scanning class.

Descriptor	Definition
Attribute name	Switch port
Data type	Enumerated vocabulary: Switch_Port_Vocabulary
Value space	The enumerated vocabulary is: { ps/2 | game | serial | usb | firewire | infrared | bluetooth }. Default=usb.
Multiplicity	[0..1]
Description	Port used by a switch input. The value space for this vocabulary is approved by IMS GLC. The syntax and semantics of the approved list of terms shall be supported by all software components implementing this Information Model. The value space for the vocabulary may be extended. Such extensions may be created and used only when no approved IMS GLC value satisfies the expressive need of an implementing community to define the shape of a collection.

6.30.3 'Dwell Time' Attribute Description

Table 6.218 Description of the 'dwell time' attribute for the Directed_Scanning class.

Descriptor	Definition
Attribute name	dwell time
Data type	Decimal (10, 4)
Value space	0.0 < dwell time. Default=0.5.
Multiplicity	[0..1]
Description	Time in seconds to dwell in order to deem that a selection has been made when *point-and-dwell* is being used. NOTE: This value is in seconds.

6.30.4 'Switch Assignment' Attribute Description

Table 6.219 Description of the 'switch assignment' attribute for the Directed_Scanning class.

Descriptor	Definition
Attribute name	switch assignment
Data type	Switch_Assignment
Value space	Container
Multiplicity	[1..unbounded], unordered
Description	Collection of data elements that states a preference for an assigned function of a numbered *switch*.

6.30.5 'Extension' Attribute Description

Table 6.220 Description of the 'extension' attribute for the Directed_Scanning class.

Descriptor	Definition
Attribute name	extension
Data type	Unspecified
Value space	Defined in terms of how the Information Model is realized by a binding.
Multiplicity	[0..unbounded], unordered
Description	This is a placeholder. It informs bindings of this Information Model as to the valid locations for the inclusion that extend the parent class.

6.31 Code_Selection Class Description

The PIM for the Automatic Scanning data model is shown in Figure 6.30.

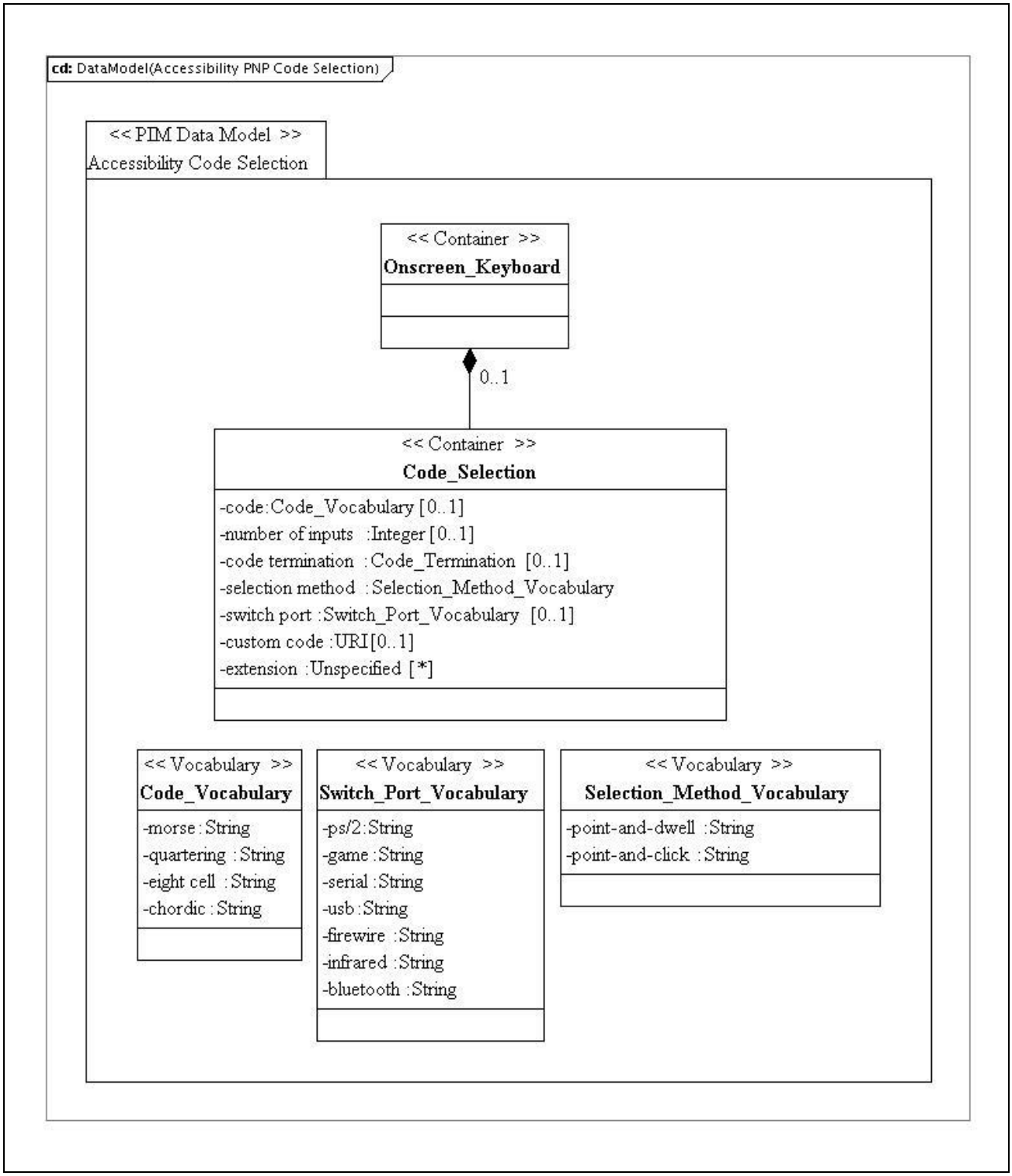


Figure 6.30 — Code_Selection class diagram.

Table 6.221 Description of the 'Code_Selection' class.

Descriptor	Definition
Class name	Code_Selection
Class type	Container
Parents	Onscreen_Keyboard
Children	[code, number of inputs, code termination, selection method, switch port, custom code, extension], unordered
Description	Collection of needs and preferences for the use of *code selection*.

6.31.1 'Code' Attribute Description

Table 6.222 Description of the 'code' attribute for the Code_Selection class.

Descriptor	Definition
Attribute name	code
Data type	Enumerated vocabulary: Code_Vocabulary
Value space	The enumerated vocabulary is: { morse | quartering | eight cell | chordic }. Default=morse.
Multiplicity	[0..1]
Description	What *code* to use to represent possible inputs. The value space for this vocabulary is approved by IMS GLC. The syntax and semantics of the approved list of terms shall be supported by all software components implementing this Information Model. The value space for the vocabulary may be extended. Such extensions may be created and used only when no approved IMS GLC value satisfies the expressive need of an implementing community to define the shape of a collection.

6.31.2 'Number of Inputs' Attribute Description

Table 6.223 Description of the 'number of inputs' attribute for the Code_Selection class.

Descriptor	Definition
Attribute name	number of inputs
Data type	Integer
Value space	1 ≤ number of inputs. Default=2.
Multiplicity	[0..1]
Description	Number of *switches*, keys or cells available to enter a *code*.

6.31.3 'Code Termination' Attribute Description

Table 6.224 Description of the 'code termination' attribute for the Code_Selection class.

Descriptor	Definition
Attribute name	code termination
Data type	Code_Termination
Value space	Container
Multiplicity	[0..1]
Description	Collection of data elements that states a preference for a method to use at the end of a *code* for variable-length *codes*.

6.31.4 'Selection Method' Attribute Description

Table 6.225 Description of the 'selection method' attribute for the Code_Selection class.

Descriptor	Definition
Attribute name	selection method
Data type	Enumerated vocabulary: Selection_Method_Vocabulary
Value space	The enumerated vocabulary is: { point-and-dwell | point-and-click }. Default=point-and-click.
Multiplicity	[0..1]
Description	*Selection method* to use to activate a key. The value space for this vocabulary is approved by IMS GLC. The syntax and semantics of the approved list of terms shall be supported by all software components implementing this Information Model. The value space for the vocabulary may be extended. Such extensions may be created and used only when no approved IMS GLC value satisfies the expressive need of an implementing community to define the shape of a collection.

6.31.5 'Switch Port' Attribute Description

Table 6.226 Description of the 'switch port' attribute for the Code_Selection class.

Descriptor	Definition
Attribute name	Switch port
Data type	Enumerated vocabulary: Switch_Port_Vocabulary
Value space	The enumerated vocabulary is: { ps/2 | game | serial | usb | firewire | infrared | bluetooth }. Default=usb.
Multiplicity	[0..1]
Description	Port used by a switch input. The value space for this vocabulary is approved by IMS GLC. The syntax and semantics of the approved list of terms shall be supported by all software components implementing this Information Model. The value space for the vocabulary may be extended. Such extensions may be created and used only when no approved IMS GLC value satisfies the expressive need of an implementing community to define the shape of a collection.

6.31.6 'Custom Code' Attribute Description

Table 6.227 Description of the 'custom code' attribute for the Code_Selection class.

Descriptor	Definition
Attribute name	custom code
Data type	URI
Value space	See Table 6.1.
Multiplicity	[0..1]
Description	Data element identifying an external document containing a specification of a custom *code* scheme.

6.31.7 'Extension' Attribute Description

Table 6.228 Description of the 'extension' attribute for the Code_Selection class.

Descriptor	Definition
Attribute name	extension
Data type	Unspecified
Value space	Defined in terms of how the Information Model is realized by a binding.
Multiplicity	[0..unbounded], unordered
Description	This is a placeholder. It informs bindings of this Information Model as to the valid locations for the inclusion that extend the parent class.

6.32 Resizable_Keys Class Description

The PIM for the Resizable_Keys data model is shown in Figure 6.31.

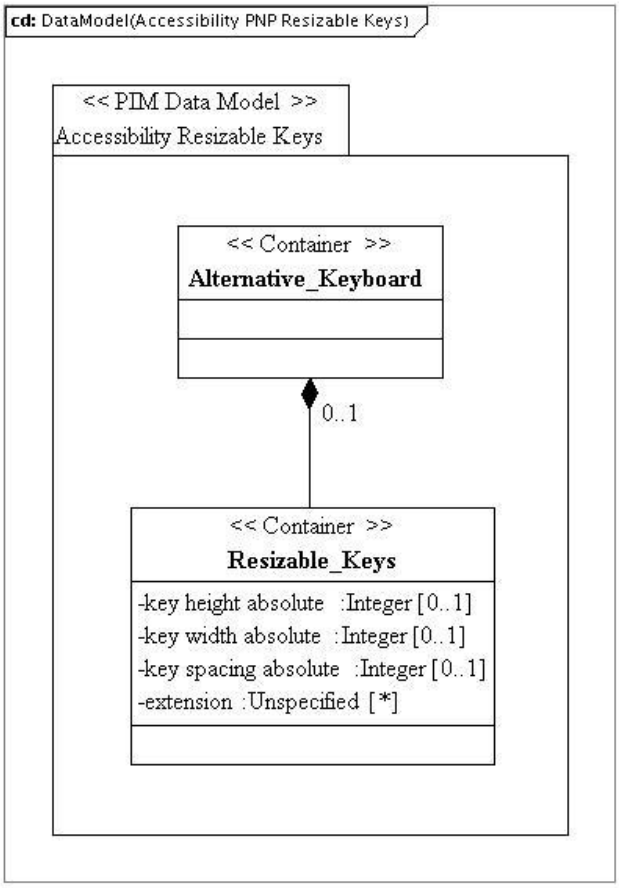


Figure 6.31 — Resizable_Keys class diagram.

Table 6.229 Description of the 'Resizable_Keys' class.

Descriptor	Definition
Class name	Resizable_Keys
Class type	Container
Parents	Alternative_Keyboard
Children	[key height absolute, key width absolute, key spacing absolute, extension], unordered
Description	Collection of data elements that states a preference for how to configure keys when an *alternative keyboard* allows key sizes to be adjusted.

6.32.1 'Key Height Absolute' Attribute Description

Table 6.230 Description of the 'key height absolute' attribute for the Resizable_Keys class.

Descriptor	Definition
Attribute name	key height absolute
Data type	Integer
Value space	1 ≤ key height absolute. Default=10.
Multiplicity	[0..1]
Description	Height, in millimeters, of a key in an *alternative keyboar*d. NOTE This value is in millimeters.

6.32.2 'Key Width Absolute' Attribute Description

Table 6.231 Description of the 'key width absolute' attribute for the Resizable_Keys class.

Descriptor	Definition
Attribute name	key width absolute
Data type	Integer
Value space	1 ≤ key width absolute. Default=10.
Multiplicity	[0..1]
Description	Height, in millimeters, of a key in an *alternative keyboar*d. NOTE This value is in millimeters.

6.32.3 'Key Spacing Absolute' Attribute Description

Table 6.232 Description of the 'key spacing absolute' attribute for the Resizable_Keys class.

Descriptor	Definition
Attribute name	key spacing absolute
Data type	Integer
Value space	0 ≤ key spacing absolute. Default=0.
Multiplicity	[0..1]
Description	Spacing, in millimeters, between keys in an *alternative keyboar*d. NOTE This value is in millimeters.

6.32.4 'Extension' Attribute Description

Table 6.233 Description of the 'extension' attribute for the Resizable_Keys class.

Descriptor	Definition
Attribute name	extension
Data type	Unspecified
Value space	Defined in terms of how the Information Model is realized by a binding.
Multiplicity	[0..unbounded], unordered
Description	This is a placeholder. It informs bindings of this Information Model as to the valid locations for the inclusion that extend the parent class.

6.33 Relative_Pointing Class Description

The PIM for the Relative_pointing data model is shown in Figure 6.32.

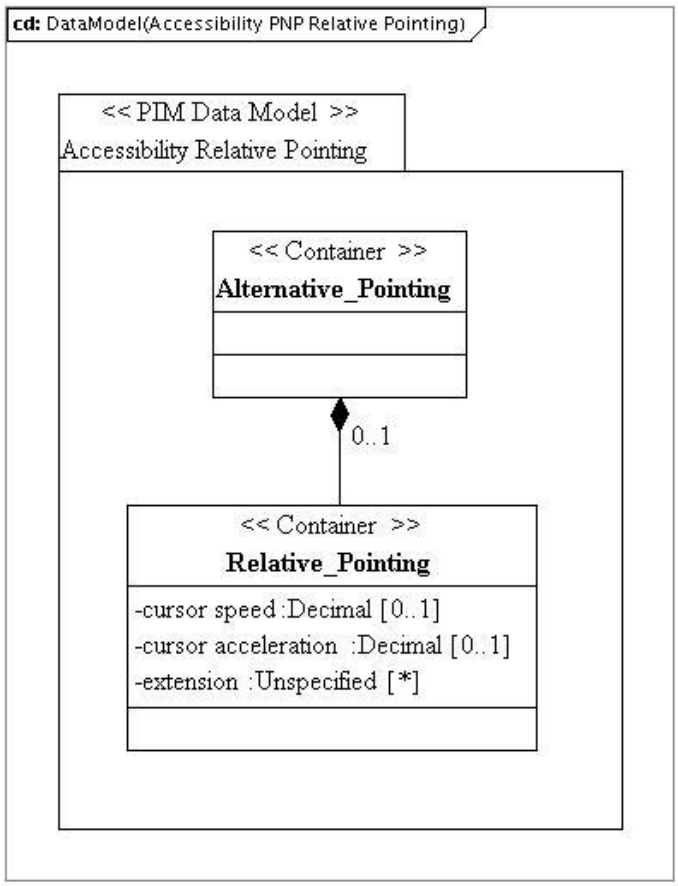


Figure 6.32 — Relative_Pointing class diagram.

Table 6.234 Description of the 'Relative_Pointing' class.

Descriptor	Definition
Class name	Relative_Pointing
Class type	Container
Parents	Alternative_Pointing
Children	[cursor speed, cursor acceleration, extension], unordered
Description	Collection of needs and preferences for how to configure a *relative pointing device.* NOTE: Mutually exclusive with absolute pointing.

6.33.1 'Cursor Speed' Attribute Description

Table 6.235 Description of the 'cursor speed' attribute for the Relative_Pointing class.

Descriptor	Definition
Attribute name	cursor speed
Data type	Decimal (10, 4)
Value space	0.0 ≤ cursor speed ≤ 1.0. Default=0.5.
Multiplicity	[0..1]
Description	Speed at which a *"mouse" cursor* or *relative pointing device* moves across the screen. NOTE Use 0.0 = "slow", 0.5 = "medium", 1.0 = "fast".

6.33.2 'Cursor Acceleration' Attribute Description

Table 6.236 Description of the 'cursor acceleration' attribute for the Relative_Pointing class.

Descriptor	Definition
Attribute name	cursor acceleration
Data type	Decimal (10, 4)
Value space	0.0 ≤ cursor acceleration ≤ 1.0. Default=0.5.
Multiplicity	[0..1]
Description	Initial value for the acceleration of a *"mouse" cursor* or *relative* pointing *device* from rest to its closing speed. NOTE Use 0.0 = "slow", 0.5 = "medium", 1.0 = "fast".

6.33.3 'Extension' Attribute Description

Table 6.237 Description of the 'extension' attribute for the Relative_Pointing class.

Descriptor	Definition
Attribute name	extension
Data type	Unspecified
Value space	Defined in terms of how the Information Model is realized by a binding.
Multiplicity	[0..unbounded], unordered
Description	This is a placeholder. It informs bindings of this Information Model as to the valid locations for the inclusion that extend the parent class.

6.34 Dwell_Select Class Description

The PIM for the Dwell_Select data model is shown in Figure 6.33.

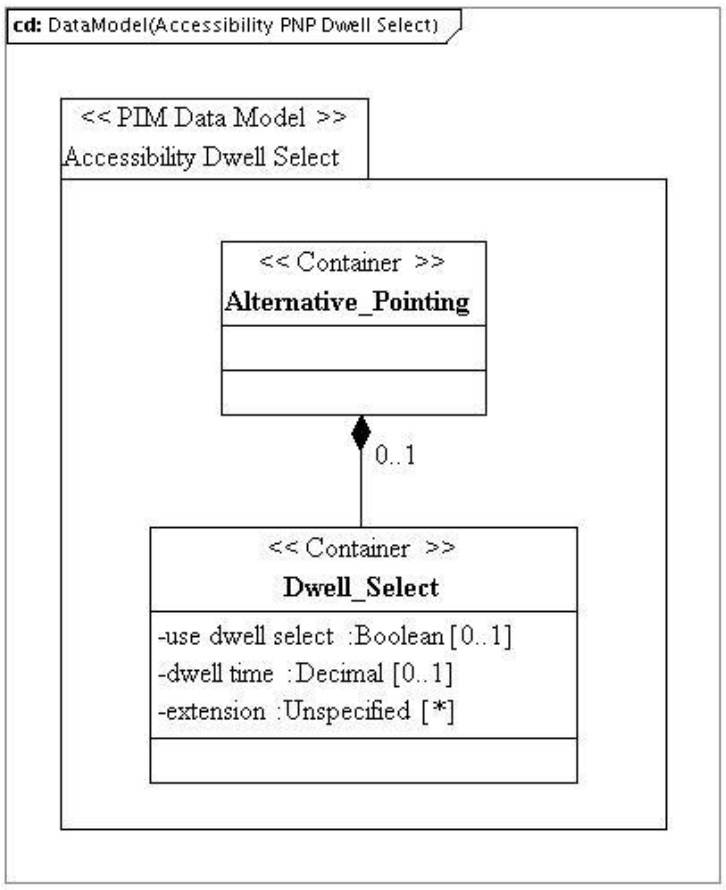


Figure 6.33 — Dwell_Select class diagram.

Table 6.238 Description of the 'Dwell_Select' class.

Descriptor	Definition
Class name	Dwell_Select
Class type	Container
Parents	Alternative_Pointing
Children	[use dwell select, dwell time, extension], unordered
Description	Preference to use dwell for selection when using an *alternative pointing device*. NOTE Mutually exclusive with switch select.

6.34.1 'Use Dwell Select' Attribute Description

Table 6.239 Description of the 'use dwell select' attribute for the Dwell_Select class.

Descriptor	Definition
Attribute name	use dwell select
Data type	Boolean
Value space	Enumerated as: { true | false }.
Multiplicity	[0..1]
Description	Defines if the dwell selection is support.

6.34.2 'Dwell Time' Attribute Description

Table 6.240 Description of the 'dwell time' attribute for the Dwell_Select class.

Descriptor	Definition
Attribute name	dwell time
Data type	Decimal (10, 4)
Value space	0.0 < dwell time. Default=0.5.
Multiplicity	[0..1]
Description	Time in seconds to dwell in order to deem that a selection has been made when *point-and-dwell* is being used. NOTE: This value is in seconds.

6.34.3 'Extension' Attribute Description

Table 6.241 Description of the 'extension' attribute for the Dwell_Select class.

Descriptor	Definition
Attribute name	extension
Data type	Unspecified
Value space	Defined in terms of how the Information Model is realized by a binding.
Multiplicity	[0..unbounded], unordered
Description	This is a placeholder. It informs bindings of this Information Model as to the valid locations for the inclusion that extend the parent class.

6.35 Command_And_Control Class Description

The PIM for the Command_And_Control data model is shown in Figure 6.34.

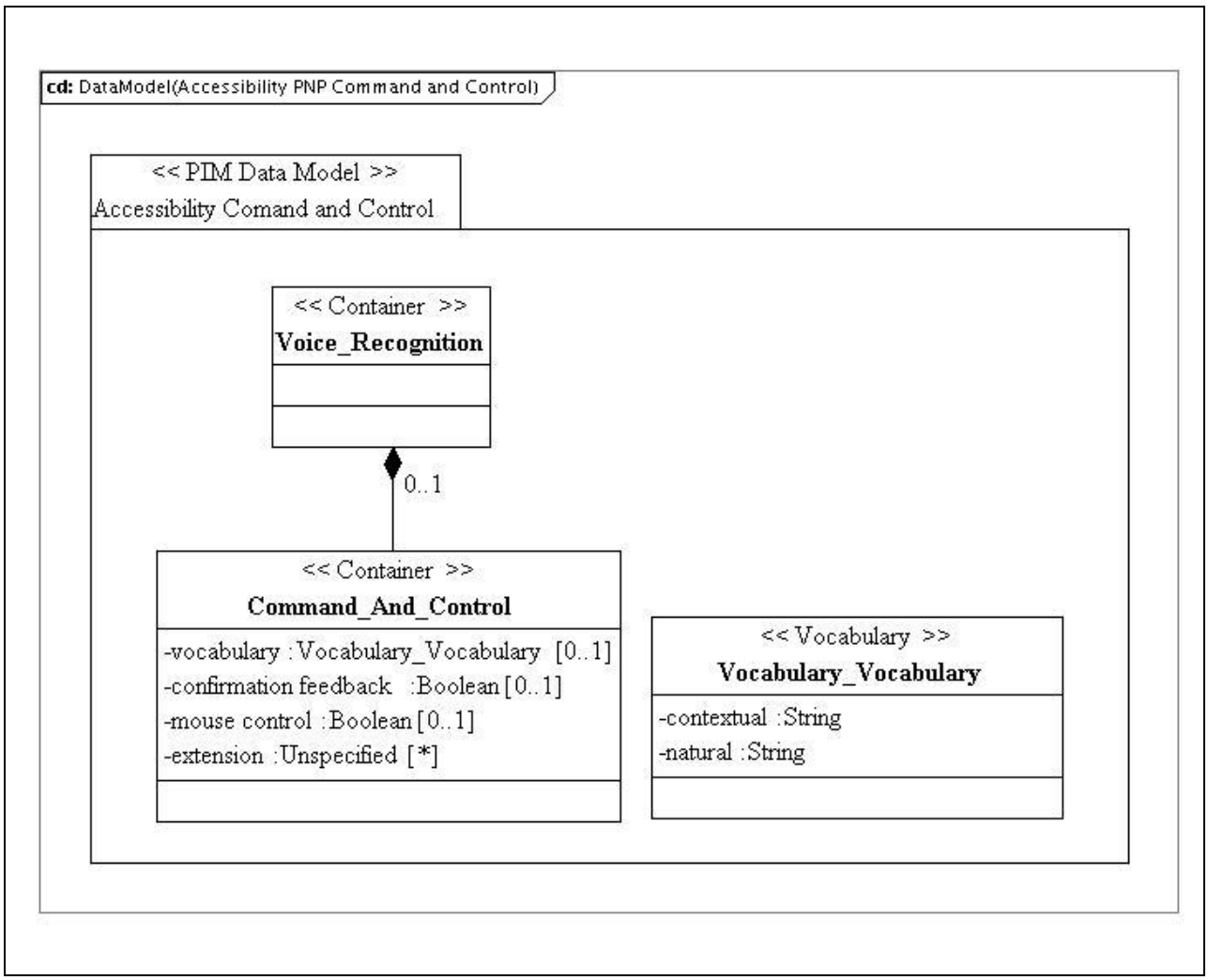


Figure 6.34 — Command_And_Control class diagram.

Table 6.242 Description of the 'Command_And_Control' class.

Descriptor	Definition
Class name	Comamnd_And_Control
Class type	Container
Parents	Voice_Recognition
Children	[vocabulary, conformation feedback, mouse control, extension], unordered
Description	Collection of needs and preferences for a *voice recognition system's* command and control settings.

6.35.1 'Vocabulary' Attribute Description

Table 6.243 Description of the 'vocabulary' attribute for the Command_And_Control class.

Descriptor	Definition
Attribute name	vocabulary
Data type	Enumerated vocabulary: Vocabulary_Vocabulary
Value space	The enumerated vocabulary is: { contextual | natural }. Default=contextual.
Multiplicity	[0..1]
Description	Type of *voice recognition system* vocabulary to use. The value space for this vocabulary is approved by IMS GLC. The syntax and semantics of the approved list of terms shall be supported by all software components implementing this Information Model. The value space for the vocabulary may be extended. Such extensions may be created and used only when no approved IMS GLC value satisfies the expressive need of an implementing community to define the shape of a collection.

6.35.2 'Confirmation Feedback' Attribute Description

Table 6.244 Description of the 'confirmation feedback' attribute for the Command_And_Control class.

Descriptor	Definition
Attribute name	confirmation feedback
Data type	Boolean
Value space	Enumerated as: { true | false }. Default=true.
Multiplicity	[0..1]
Description	Preference for a *voice recognition system* to provide auditory confirmation feedback for recognized commands.

6.35.3 'Mouse Control' Attribute Description

Table 6.245 Description of the 'mouse control' attribute for the Command_And_Control class.

Descriptor	Definition
Attribute name	mouse control
Data type	Boolean
Value space	Enumerated as: { true | false }. Default=true.
Multiplicity	[0..1]
Description	Preference to use voice commands to control "mouse" movements.

6.35.4 'Extension' Attribute Description

Table 6.246 Description of the 'extension' attribute for the Command_And_Control class.

Descriptor	Definition
Attribute name	extension
Data type	Unspecified
Value space	Defined in terms of how the Information Model is realized by a binding.
Multiplicity	[0..unbounded], unordered
Description	This is a placeholder. It informs bindings of this Information Model as to the valid locations for the inclusion that extend the parent class.

6.36 Code_Termination Class Description

The PIM for the Code_Termination data model is shown in Figure 6.35.

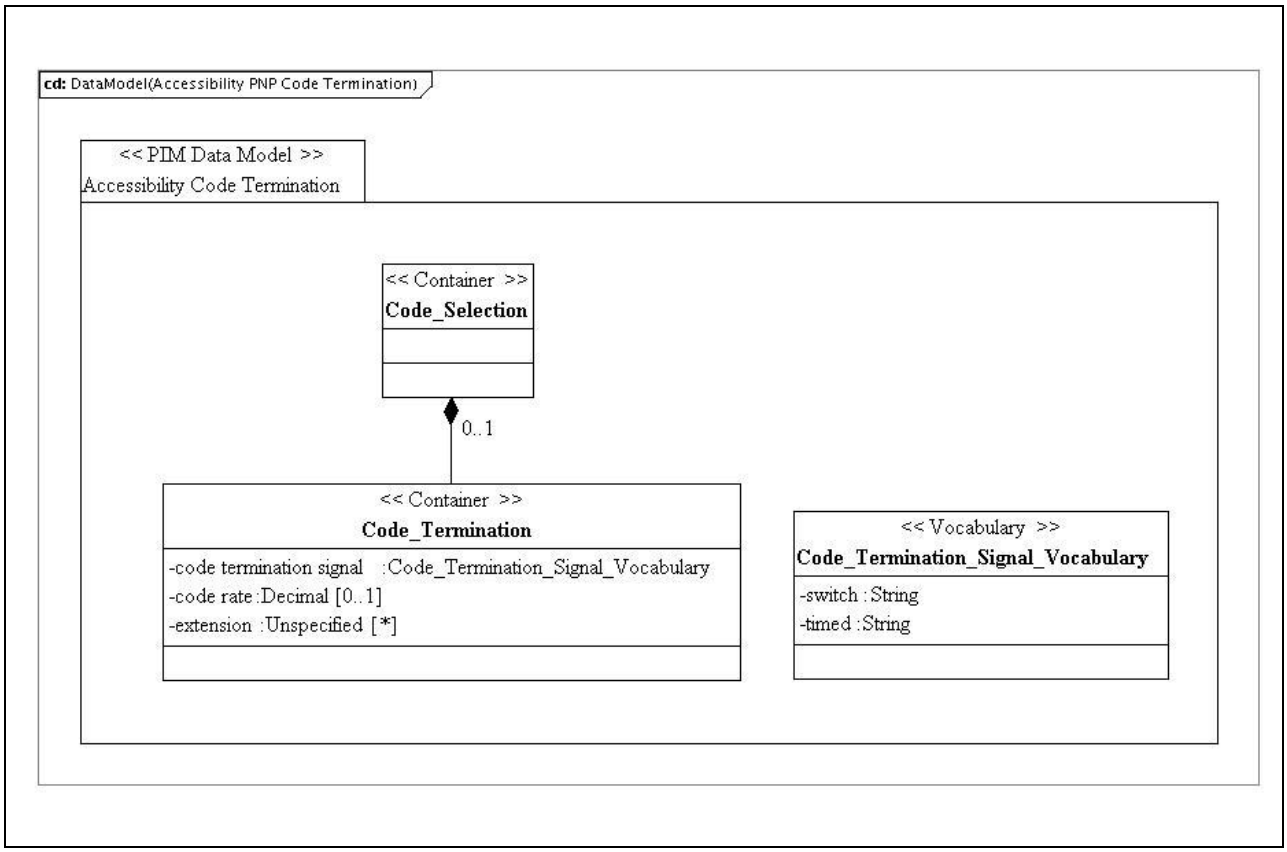


Figure 6.35 — Code_Termination class diagram.

Table 6.247 Description of the 'Code_Termination' class.

Descriptor	Definition
Class name	Code_Termination
Class type	Container
Parents	Code_Selection
Children	[code termination signal, code rate, extension], unordered
Description	Collection of needs and preferences for a method to use at the end of a *code* for variable-length codes.

6.36.1 'Code Termination Signal' Attribute Description

Table 6.248 Description of the 'code termination signal' attribute for Code_Termination class.

Descriptor	Definition
Attribute name	code termination signal
Data type	Enumerated vocabulary: Code_Termination_Signal_Vocabulary
Value space	The enumerated vocabulary is: { switch | timed }. Default=switch.
Multiplicity	[1]
Description	Signal to use at the end of a *code* for variable-length *codes*. The value space for this vocabulary is approved by IMS GLC. The syntax and semantics of the approved list of terms shall be supported by all software components implementing this Information Model. The value space for the vocabulary may be extended. Such extensions may be created and used only when no approved IMS GLC value satisfies the expressive need of an implementing community to define the shape of a collection.

6.36.2 'Code Rate' Attribute Description

Table 6.249 Description of the 'code rate' attribute for the Code_Termination class.

Descriptor	Definition
Attribute name	code rate
Data type	Decimal (10, 4)
Value space	$0.5 \leq$ code rate ≤ 20.0. Default=3.0.
Multiplicity	[0..1]
Description	Time, in seconds, available to enter a *code.* NOTE 1 This is only applicable when the code termination is "timed". NOTE 2 This value is in seconds

6.36.3 'Extension' Attribute Description

Table 6.250 Description of the 'extension' attribute for the Code_Termination class.

Descriptor	Definition
Attribute name	extension
Data type	Unspecified
Value space	Defined in terms of how the Information Model is realized by a binding.
Multiplicity	[0..unbounded], unordered
Description	This is a placeholder. It informs bindings of this Information Model as to the valid locations for the inclusion that extend the parent class.

6.37 Switch_Assignment Class Description

The PIM for the Automatic Scanning data model is shown in Figure 6.36.

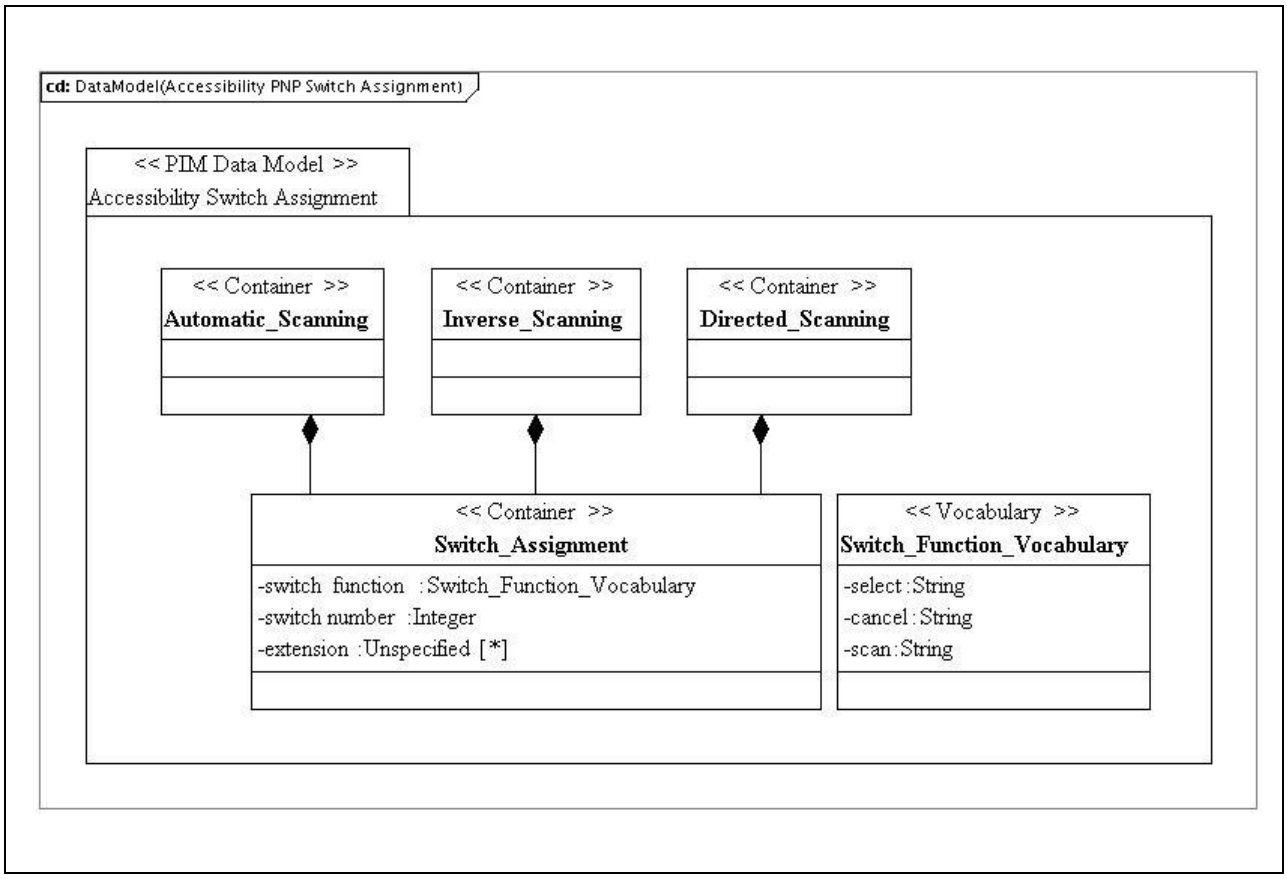


Figure 6.36 — Switch_Assignment class diagram.

Table 6.251 Description of the 'Switch_Assignment' class.

Descriptor	Definition
Class name	Switch_Assignment
Class type	Container
Parents	Automatic_Scanning, Inverse_Scanning, Directed_Scanng
Children	[switch function, switch number, extension], unordered
Description	Collection of data elements that states a preference for an assigned function of a numbered *switch*.

6.37.1 'Switch Function' Attribute Description

Table 6.252 Description of the 'switch function' attribute for the Switch_Assignment class.

Descriptor	Definition
Attribute name	switch function
Data type	Enumerated vocabulary: Switch_Function_Vocabulary
Value space	The enumerated vocabulary is: { select | cancel | scan }. Default=select.
Multiplicity	[1]
Description	Function to assign to a particular *switch* number. The value space for this vocabulary is approved by IMS GLC. The syntax and semantics of the approved list of terms shall be supported by all software components implementing this Information Model. The value space for the vocabulary may be extended. Such extensions may be created and used only when no approved IMS GLC value satisfies the expressive need of an implementing community to define the shape of a collection.

6.37.2 'Switch Number' Attribute Description

Table 6.253 Description of the 'switch number' attribute for the Switch_Assignment class.

Descriptor	Definition
Attribute name	switch number
Data type	Integer
Value space	[1]
Multiplicity	1 ≤ switch number.
Description	*Switch* number bound to the switch function.

6.37.3 'Extension' Attribute Description

Table 6.254 Description of the 'extension' attribute for the Switch_Assignment class.

Descriptor	Definition
Attribute name	extension
Data type	Unspecified
Value space	Defined in terms of how the Information Model is realized by a binding.
Multiplicity	[0..unbounded], unordered
Description	This is a placeholder. It informs bindings of this Information Model as to the valid locations for the inclusion that extend the parent class.

6.38 Content Class Description

The PIM for the Content data model is shown in Figure 6.37.

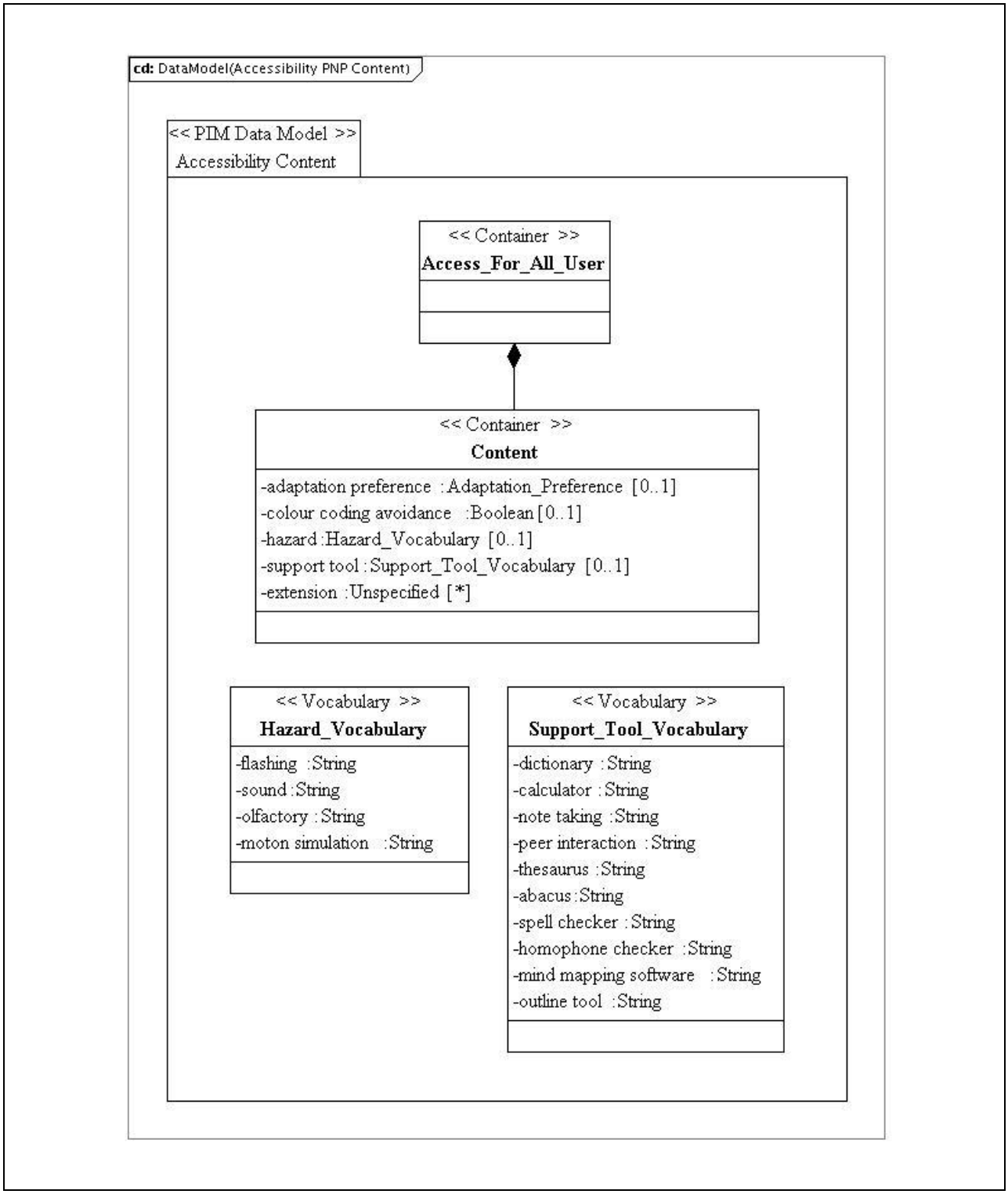


Figure 6.37 — Content class diagram.

Table 6.255 Description of the 'Content' class.

Descriptor	Definition
Class name	Content
Class type	Container
Parents	Access_For_All_User
Children	[adaptation preference, colour coding avoidance, hazard, support tool, extension], unordered
Description	Collection of needs and preferences for content, specifying any desired transformations or enhancements.

6.38.1 'Adaptation Preference' Attribute Description

Table 6.256 Description of the 'adaptation preference' attribute for the Content class.

Descriptor	Definition
Attribute name	adaptation preference
Data type	Adaptation_Preference
Value space	Container
Multiplicity	[0..unbounded], unordered
Description	Collection of information that gives detailed information about an adaptation.

6.38.2 'Colour Coding Avoidance' Attribute Description

Table 6.257 Description of the 'colour coding avoidance' attribute for the Content class.

Descriptor	Definition
Attribute name	colour coding avoidance
Data type	Boolean
Value space	Enumerated as: { true | false }. Default=false.
Multiplicity	[0..1]
Description	Preference for avoiding the communication of information by use of colour alone.

6.38.3 'Hazard' Attribute Description

Table 6.258 Description of the 'hazard' attribute for the Content class.

Descriptor	Definition
Attribute name	hazard
Data type	Enumerated vocabulary: Hazard_Vocabulary
Value space	The enumerated vocabulary is: { flashing | sound | olfactory | motion simulation }.
Multiplicity	[0..unbounded], unordered
Description	A characteristic of a digital resource that may be specified as being dangerous to a user. EXAMPLE Flashing animations can trigger seizures in people with photosensitive epilepsy. The value space for this vocabulary is approved by IMS GLC. The syntax and semantics of the approved list of terms shall be supported by all software components implementing this Information Model. The value space for the vocabulary may be extended. Such extensions may be created and used only when no approved IMS GLC value satisfies the expressive need of an implementing community to define the shape of a collection.

6.38.4 'Support Tool' Attribute Description

Table 6.259 Description of the 'support tool' attribute for the Content class.

Descriptor	Definition
Attribute name	support tool
Data type	Enumerated vocabulary: Support_Tool_Vocabulary
Value space	The enumerated vocabulary is: { dictionary | calculator | note taking | peer interaction | thesaurus | abacus | spell checker | homophone checker | mind mapping software | outline tool }.
Multiplicity	[0..unbounded], unordered
Description	Electronic tool associated with a resource. The value space for this vocabulary is approved by IMS GLC. The syntax and semantics of the approved list of terms shall be supported by all software components implementing this Information Model. The value space for the vocabulary may be extended. Such extensions may be created and used only when no approved IMS GLC value satisfies the expressive need of an implementing community to define the shape of a collection.

6.38.5 'Extension' Attribute Description

Table 6.260 Description of the 'extension' attribute for the Content class.

Descriptor	Definition
Attribute name	extension
Data type	Unspecified
Value space	Defined in terms of how the Information Model is realized by a binding.
Multiplicity	[0..unbounded], unordered
Description	This is a placeholder. It informs bindings of this Information Model as to the valid locations for the inclusion that extend the parent class.

6.39 Adaptation_Preference Class Description

The PIM for the Adaptation data model is shown in Figure 6.38.

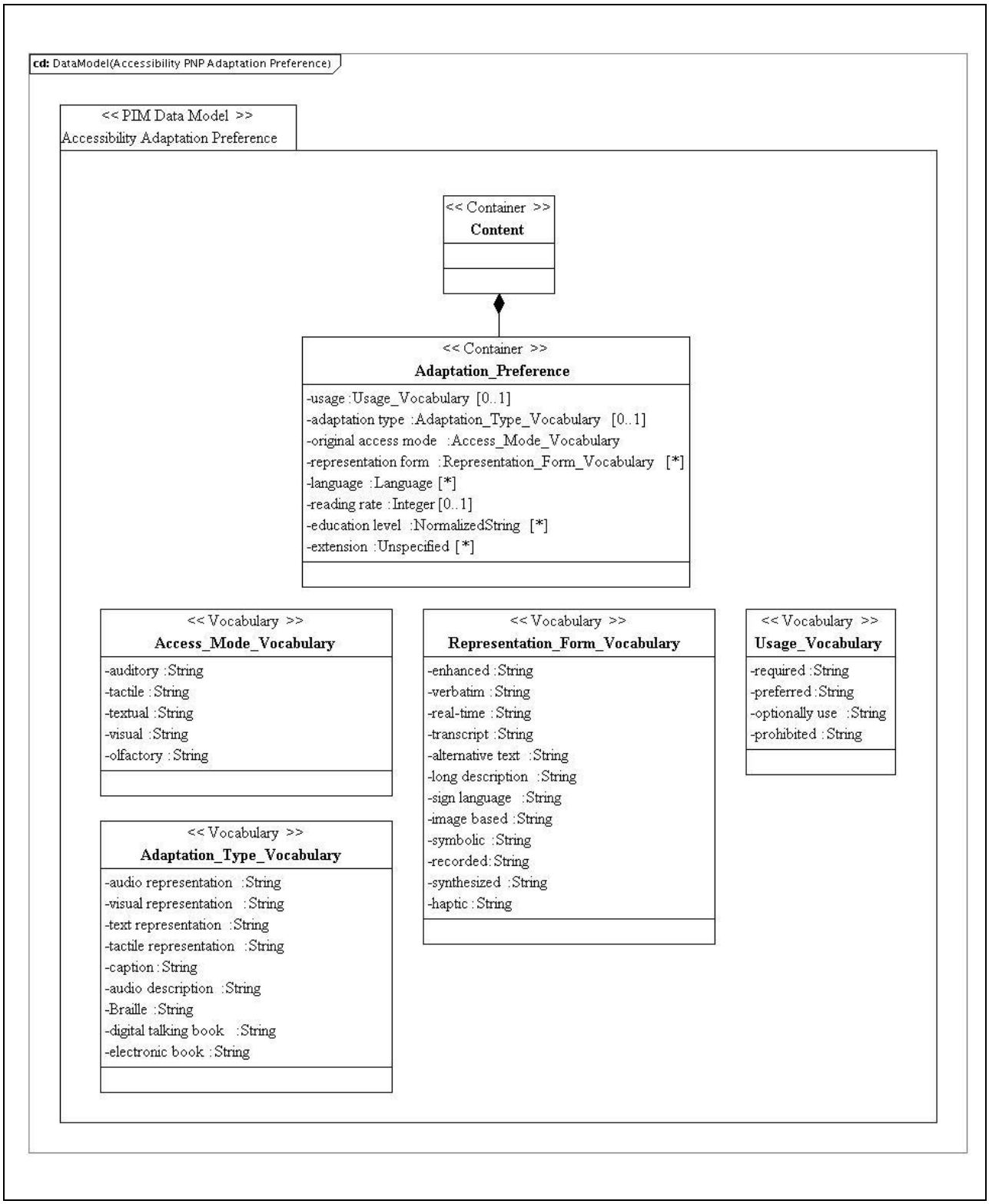


Figure 6.38 — Adaptation_Preference class diagram.

Table 6.261 Description of the 'Adaptation_Preference' class.

Descriptor	Definition
Class name	Adaptation
Class type	Container
Parents	Content
Children	[usage, adaptation type, original access mode, representation form, language, reading rate, education level, extension], unordered
Description	Collection of information that gives detailed information about an adaptation.

6.39.1 'Usage' Attribute Description

Table 6.262 Description of the 'usage' attribute for the Adaptation class.

Descriptor	Definition
Attribute name	usage
Data type	Enumerated vocabulary: Usage_Vocabulary
Value space	The enumerated vocabulary is: {required | preferred | optionally use | prohibited }. Default=preferred.
Multiplicity	[0..1]
Description	Rating for the collection of AfA needs and preferences. The value space for this vocabulary is approved by IMS GLC. The syntax and semantics of the approved list of terms shall be supported by all software components implementing this Information Model. The value space for the vocabulary may be extended. Such extensions may be created and used only when no approved IMS GLC value satisfies the expressive need of an implementing community to define the shape of a collection.

6.39.2 'Adaptation Type' Attribute Description

Table 6.263 Description of the 'adaptation type' attribute for the Adaptation class.

Descriptor	Definition
Attribute name	adaptation type
Data type	Enumerated vocabulary: Adaptation_Type_Vocabulary
Value space	The enumerated vocabulary is: { audio representation | tactile representation | text representation | visual representation | audio description | caption | e-book | sign language }.
Multiplicity	[0..1]
Description	Nature or genre of the adaptation [ISO 15836:2003]. The value space for this vocabulary is approved by IMS GLC. The syntax and semantics of the approved list of terms shall be supported by all software components implementing this Information Model. The value space for the vocabulary may be extended. Such extensions may be created and used only when no approved IMS GLC value satisfies the expressive need of an implementing community to define the shape of a collection.

6.39.3 'Original Access Mode' Attribute Description

Table 6.264 Description of the 'original access mode' attribute for the Adaptation class.

Descriptor	Definition
Attribute name	original access mode
Data type	Enumerated vocabulary: Access_Mode_Vocabulary
Value space	The enumerated vocabulary is: { auditory | tactile | textual | visual | olfactory }.
Multiplicity	[1]
Description	Original **access mode** of a **resource** which should be matched or adapted. The value space for this vocabulary is approved by IMS GLC. The syntax and semantics of the approved list of terms shall be supported by all software components implementing this Information Model. The value space for the vocabulary may be extended. Such extensions may be created and used only when no approved IMS GLC value satisfies the expressive need of an implementing community to define the shape of a collection.

6.39.4 'Representation Form' Attribute Description

Table 6.265 Description of the 'representation form' attribute for the Adaptation class.

Descriptor	Definition
Attribute name	representation form
Data type	Enumerated vocabulary: Repesentation_Form_Vocabulary
Value space	The enumerated vocabulary is: { enhanced | verbatim | reduced | real-time | transcript | alternative text | long description | talking book | Daisy | image-based | symbolic | recorded | synthesized | braille | haptic }.
Multiplicity	[0..1]
Description	Additional details about the adaptation type. The value space for this vocabulary is approved by IMS GLC. The syntax and semantics of the approved list of terms shall be supported by all software components implementing this Information Model. The value space for the vocabulary may be extended. Such extensions may be created and used only when no approved IMS GLC value satisfies the expressive need of an implementing community to define the shape of a collection.

6.39.5 'Language' Attribute Description

Table 6.266 Description of the 'language' attribute for the Adaptation class.

Descriptor	Definition
Attribute name	language
Data type	Language
Value space	ISO 639-2/T
Multiplicity	[0..unbounded], unordered
Description	Language of the **adaptation**.

6.39.6 'Reading Rate' Attribute Description

Table 6.267 Description of the 'reading rate' attribute for the Adaptation class.

Descriptor	Definition
Attribute name	reading rate
Data type	Integer
Value space	1 ≤ reading rate ≤ 300. Default=120.
Multiplicity	[0..1].
Description	Rate of presentation of text that is automatically scrolled, as in captions for a film. NOTE This value is in words per minutes.

6.39.7 'Education Level' Attribute Description

Table 6.268 Description of the 'education level' attribute for the Adaptation class.

Descriptor	Definition
Attribute name	education level
Data type	NormalizedString
Value space	See Table 6.1.
Multiplicity	[0..unbounded], unordered
Description	Audience education level [DCMI MT]. NOTE: Implementations should choose a vocabulary that is appropriate to their context

6.39.8 'Extension' Attribute Description

Table 6.269 Description of the 'extension' attribute for the Adaptation class.

Descriptor	Definition
Attribute name	extension
Data type	Unspecified
Value space	Defined in terms of how the Information Model is realized by a binding.
Multiplicity	[0..unbounded], unordered
Description	This is a placeholder. It informs bindings of this Information Model as to the valid locations for the inclusion that extend the parent class.

6.40 Application Class Description

The PIM for the Application data model is shown in Figure 6.39.

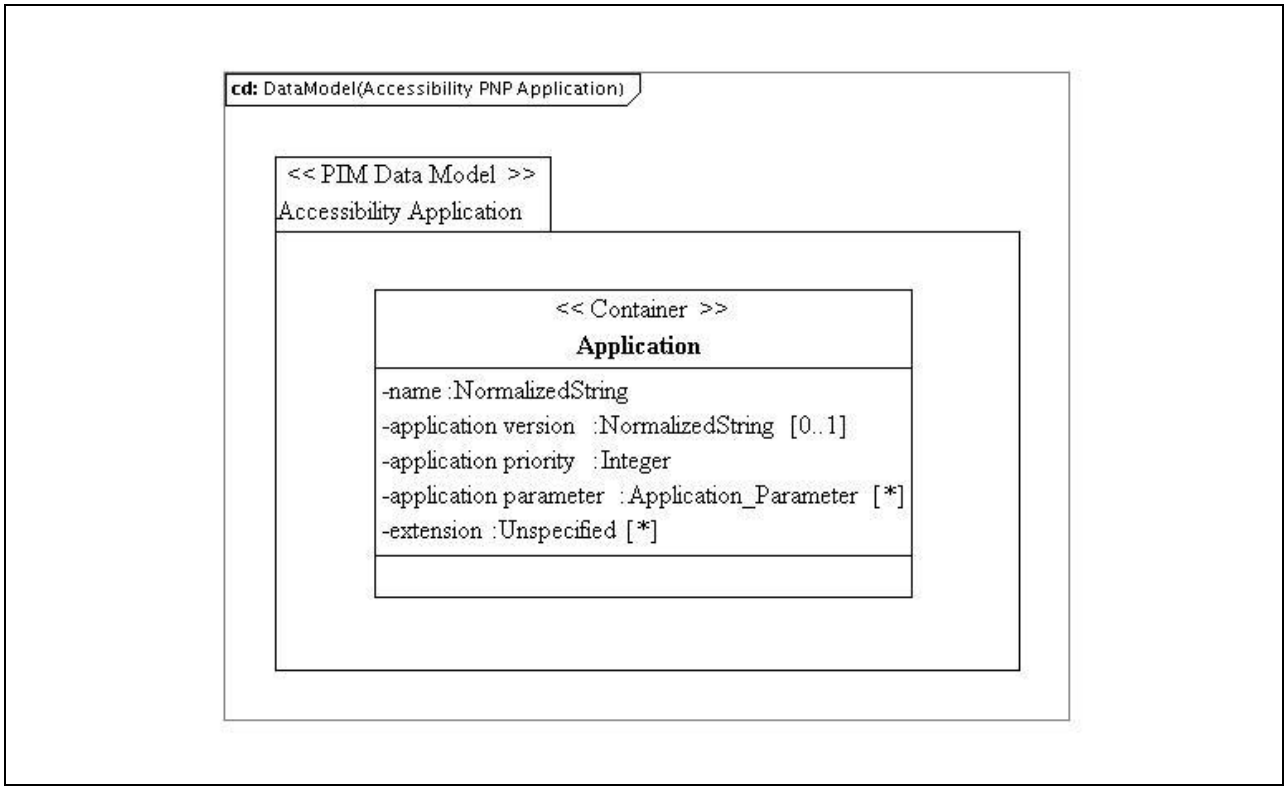


Figure 6.39 — Application class diagram.

Table 6.270 Description of the 'Application' class.

Descriptor	Definition
Class name	Application
Class type	Container
Parents	Screen_Reader, Screen_Enhancement, Text_Reading_Highlight, Braille, Tactile, Visual_Alert, Structural_Presentation, Keyboard_Enhancement, Onsceen_Keyboard, Alternaive_Keyboard, Mouse_Emulation, Alternative_Pointing, Voice_Recognition, Coded_Input, Prediction, Structural_Navigation
Children	[name, application version, application priority, application parameter, extension], unordered
Description	Collection of needs and preferences for how to configure vendor-specific parameters of assistive technology.

6.40.1 'Name' Attribute Description

Table 6.271 Description of the 'name' attribute for the Application class.

Descriptor	Definition
Attribute name	name
Data type	NormalizedString
Value space	See Table 6.1.
Multiplicity	[1]
Description	Name of an application.

6.40.2 'Application Version' Attribute Description

Table 6.272 Description of the 'application version' attribute for the Application class.

Descriptor	Definition
Attribute name	application version
Data type	NormalizedString
Value space	See Table 6.1.
Multiplicity	[0..1]
Description	Version of an application.

6.40.3 'Application Priority' Attribute Description

Table 6.273 Description of the 'application priority' attribute for the Application class.

Descriptor	Definition
Attribute name	application priority
Data type	Integer
Value space	0 ≤ application priority
Multiplicity	[1]
Description	Priority of usage of an application with respect to other applications listed. NOTE The value 0 denotes the highest priority. Successive integers serve to rank additional applications.

6.40.4 'Application Parameter' Attribute Description

Table 6.274 Description of the 'application parameter' attribute for the Application class.

Descriptor	Definition
Attribute name	application parameter
Data type	Application_Parameter
Value space	Container
Multiplicity	[0..unbonded], unordered
Description	Collection of data elements that states a preference for the value for an application-specific parameter. NOTE This parameter is to be passed into the application at run-time.

6.40.5 'Extension' Attribute Description

Table 6.275 Description of the 'extension' attribute for the Application class.

Descriptor	Definition
Attribute name	extension
Data type	Unspecified
Value space	Defined in terms of how the Information Model is realized by a binding.
Multiplicity	[0..unbounded], unordered
Description	This is a placeholder. It informs bindings of this Information Model as to the valid locations for the inclusion that extend the parent class.

6.41 Application_Parameter Class Description

The PIM for the Application Parameter data model is shown in Figure 6.40.

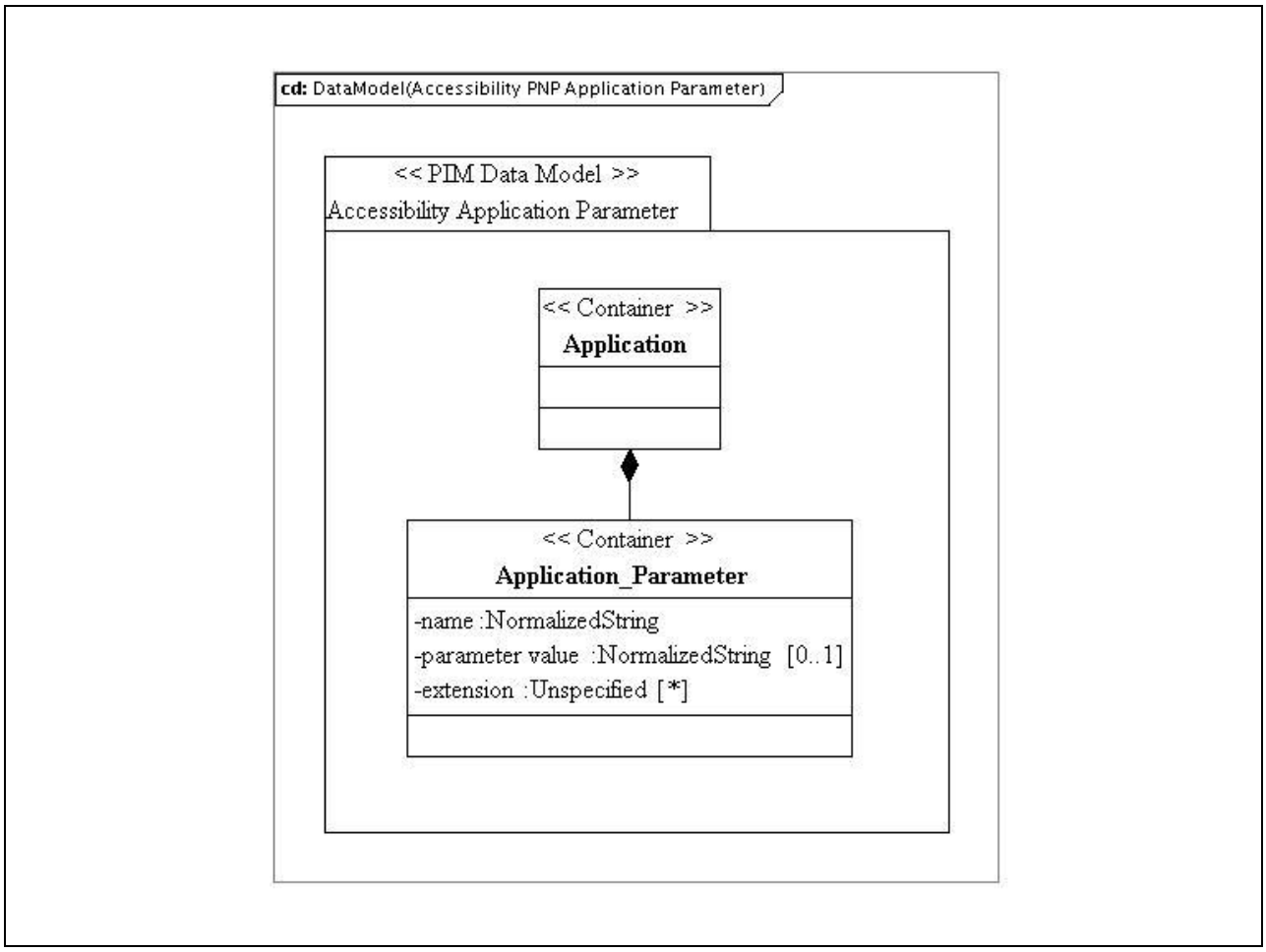


Figure 6.40 — Application Parameter class diagram.

Table 6.280 Description of the 'Application Parameter' class.

Descriptor	Definition
Class name	Application_Parameter
Class type	Container
Parents	Application
Children	[name, parameter value, extension], unordered
Description	Collection of data elements that states a preference for the value for an application-specific parameter. NOTE: This parameter is to be passed into the application at run-time.

6.41.1 'Name' Attribute Description

Table 6.281 Description of the 'name' attribute for the Application_Parameter class.

Descriptor	Definition
Attribute name	name
Data type	NormalizedString
Value space	See Table 6.1.
Multiplicity	[1]
Description	Name of a parameter.

6.41.2 'Parameter Value' Attribute Description

Table 6.282 Description of the 'parameter value' attribute for the Application_Parameter class.

Descriptor	Definition
Attribute name	parameter value
Data type	NormalizedString
Value space	See Table 6.1.
Multiplicity	[0..1]
Description	Value of a parameter.

6.41.3 'Extension' Attribute Description

Table 6.283 Description of the 'extension' attribute for the Application Parameter class.

Descriptor	Definition
Attribute name	extension
Data type	Unspecified
Value space	Defined in terms of how the Information Model is realized by a binding.
Multiplicity	[0..unbounded], unordered
Description	This is a placeholder. It informs bindings of this Information Model as to the valid locations for the inclusion that extend the parent class.

6.42 Set of Defined Vocabularies

The set of vocabularies used in this information model are listed in Table 6.284.

Table 6.284 Set of vocabularies.

Vocabulary	Description
Access_Mode_Vocabulary	{ auditory | tactile | textual | visual | olfactory }
Adaptation_Type_Vocabulary	{ audio representation | tactile representation | text representation | visual representation | audio description | caption | e-book | sign language }
Alphanumeric_Layout_Vocabulary	{ standard | sequential | frequency }
Auto_Scan_Repeat_Vocabulary	{ 1 | 2 | 3 | 4 | 5 | infinity }
Braille_Dot_Number_Vocabulary	{ 6 | 8 }
Braille_Grade_Vocabulary	{ uncontracted | contracted }
Braille_Mark_Vocabulary	{ highlight | bold | underline | italic | strikeout | colour }
Braille_Status_Vocabulary	{ off | left | right }
Code_Termination_Signal_Vocabulary	{ switch | timed }
Code_Vocabulary	{ morse | quartering | eight cell | chordic }
Colour_Vocabulary	{ red | green | blue | alpha }
Components_Shown_Vocabulary	{ list of links | annotations }
Content_Density_Vocabulary	{ overview | detailed }
Control_Flexibility_Vocabulary	{ full keyboard control | full mouse control }
Controller_Window_Vocabulary	{ hide | show }
Device_Handedness_Vocabulary	{ left | right }
Generic_Font_Face_Vocabulary	{ serif | sans serif | monospaced | cursive | fantasy }
Hazard_Vocabulary	{ flashing | sound | olfactory | motion simulation }
Link_Indication_Vocabulary	{ speak link | different voice | sound effect | none }
Mouse_Emulation_Device_Vocabulary	{ keypad | keyboard | switch | voice }
Navigation_Strategy_Vocabulary	{ breadth first | depth first }
Prediction_Type_Vocabulary	{ letter | word | word completion | command }
Reading_Unit_Vocabulary	{ word | line | sentence | paragraph }
Repesentation_Form_Vocabulary	{ enhanced | verbatim | reduced | real-time | transcript | alternative text | long description | talking book | Daisy | image-based | symbolic | recorded | synthesized | braille | haptic }
Selection_Method_Vocabulary	{ point-and-dwell | point-and-click }
Speech_Component_Vocabulary	{ alternative | controls when tabbing }
Support_Tool_Vocabulary	{ dictionary | calculator | note taking | peer interaction | thesaurus | abacus | spell checker | homophone checker | mind mapping software | outline tool }
Switch_Function_Vocabulary	{ select | cancel | scan }

Vocabulary	Description
Switch_Port_Vocabulary	{ ps/2 | game | serial | usb | firewire | infrared | bluetooth }
System_Sounds_Vocabulary	{ desktop | window | caption }
Tracking_Vocabulary	{ mouse | caret | focus }
Usage_Vocabulary	{ required | preferred | optionally use | prohibited }
Vocabulary_Vocabulary	{ contextual | natural }
Window_Layout_Vocabulary	{ tiled | overlap }

7 Extending the Specification

Each class in the specification contains extension points. New parts include additional elements, element qualifiers and vocabularies. The form of the extension is dependent on the binding being used.

The value space for each of the vocabularies is approved by IMS GLC. The value space for a vocabulary may be extended. Such extensions may be created and used only when no approved IMS GLC value satisfies the expressive need of an implementing community to define the shape of a collection.

8 Conformance

The requirements for conformance to this part of specification are dependent on the function or role played by the conformant technology or application.

Education delivery applications, agents or systems are conformant to this part of the Access For All Specification when they gather and/or process Personal Needs and Preferences statements.

Alternative access systems are conformant to this part of Access For All Specification when they respond to the generic elements of this standard that apply to the specific class of alternative access systems to which the system belongs (e.g. screen readers would respond to screen reader elements).

Annex A Vocabulary Codes

A.1 Access Mode Vocabulary Codes

The 5 basic "access mode" values are:

- visual
- textual
- auditory
- tactile
- olfactory

The coding convention for the "access mode" vocabulary is presented in Table A.1.

Table A.1 Codes Representing "access mode" Values[3].

IT Interface		Human Interface / Equivalent Linguistic Expressions			
		ISO English (eng)		ISO French (fra)	
Table ID (1)	Code (2)	Mnemonic (3)	Expression (4)	Mnemonic (5)	Expression (6)
PNP:A1	1	V	Visual		
PNP:A1	2	X	Textual		
PNP:A1	3	A	Auditory		
PNP:A1	4	T	Tactile		
PNP:A1	5	O	Olfactory		

Rule A.1-01:
If Code = 1 (Visual) is used, the access mode described uses the human sense of visual perception.

Rule A.1-02:
If Code = 2 (Textual) is used, the access mode described uses the human capability to understand text.

Rule A.1-03:
If Code = 3 (Auditory) is used, the access mode described uses the human sense of auditory perception.

Rule A.1-04:
If Code = 4 (Tactile) is used, the access mode described uses the human sense of tactile perception.

Rule A.1-05:
If Code = 5 (Olfactory) is used, the access mode described uses the human sense of smell.

[3] The structure of this and other tables in Annex A supports a bilingual, multilingual expandable approach.

A.2 Adaptation Type Vocabulary Codes

The 9 basic "adaptation type" values are:

- audio representation
- visual representation
- text representation
- tactile representation
- caption
- audio description
- Braille
- digital talking book
- electronic book

The coding convention for the "adaptability report type" vocabulary is presented in Table A.2.

Table A.2 Codes Representing "adaptation type" Values.

IT Interface		Human Interface / Equivalent Linguistic Expressions			
		ISO English (eng)		ISO French (fra)	
Table ID (1)	Code (2)	Mnemonic (3)	Expression (4)	Mnemonic (5)	Expression (6)
PNP:A2	1	AU	Audio representation		
PNP:A2	2	VI	Visual representation		
PNP:A2	3	TE	Text representation		
PNP:A2	4	TA	Tactile representation		
PNP:A2	5	CA	Caption		
PNP:A2	6	AD	Audio description		
PNP:A2	7	BR	Braille		
PNP:A2	8	DI	Digital talking book		
PNP:A2	9	EL	Electronic book		

Rule A.2-01:
Code = 1 (Audio representation) indicates that the resource contains an audio representation of the original access mode.

Rule A.2-02:
Code = 2 (Visual representation) indicates that the resource contains a visual representation of the original access mode.

Rule A.2-03:
Code = 3 (Text representation) indicates that the resource contains a text representation of the original access mode.

Rule A.2-04:
Code = 4 (Tactile representation) indicates that the resource contains a tactile representation of the original access mode.

Rule A.2-05:
Code = 5 (Caption) indicates that the resource contains a text caption of the original audio content.

Rule A.2-06:
Code = 6 (Audio description) indicates that the resource contains an audio description of the original visual content.

Rule A.2-07:
Code = 7 (Braille) indicates that the resource contains a Braille representation of the original access mode.

Rule A.2-08:
Code = 8 (Digital talking book) indicates that the resource is a digital talking book containing the intellectual content of the original access mode.

Rule A.2-09:
Code = 9 (Electronic book) indicates that the resource is an electronic book containing the intellectual content of the original access mode.

A.3 Alphanumeric Layout Vocabulary Codes

The 3 basic "alphanumeric layout" values are:

- standard
- sequential
- frequency

The coding convention for the "alphanumeric layout" vocabulary is presented in Table A.3.

Table A.3 Codes Representing "alphanumeric layout" Values.

IT Interface		Human Interface / Equivalent Linguistic Expressions			
		ISO English (eng)		ISO French (fra)	
Table ID (1)	Code (2)	Mnemonic (3)	Expression (4)	Mnemonic (5)	Expression (6)
PNP:A3	1	ST	Standard		
PNP:A3	2	SE	Sequential		
PNP:A3	3	FR	Frequency		

Rule A.3-01:
Code = 1 (Standard) implies use of a keyboard that is standard for the cultural context of the system (e.g. in the U.S. this would be a QWERTY keyboard).

Rule A.3-02:
Code = 2 (Sequential) implies use of a sequential keyboard, which arranges letters alphabetically and numbers in ascending order

Rule A.3-03:
Code = 3 (Frequency) implies use of a frequency weighted keyboard, in which frequently used keys are grouped at the centre for pointing device users or at the place where scanning begins for switch users.

A.4 Auto Scan Repeat Vocabulary Codes

The 6 basic “auto scan repeat” values are:

- 1
- 2
- 3
- 4
- 5
- infinity

The coding convention for the “auto scan repeat” vocabulary is presented in Table A.4.

Table A.4 Codes Representing “auto scan repeat” Values.

IT Interface		Human Interface / Equivalent Linguistic Expressions			
		ISO English (eng)		ISO French (fra)	
Table ID (1)	Code (2)	Mnemonic (3)	Expression (4)	Mnemonic (5)	Expression (6)
PNP:A4	1	1	1		
PNP:A4	2	2	2		
PNP:A4	3	3	3		
PNP:A4	4	4	4		
PNP:A4	5	5	5		
PNP:A4	9	I	Infinity		

Rule A.4-01:
Code = 1 (1) through Code = 5 (5) indicate that the onscreen keyboard should automatically repeat its scan cycle the indicated number of times if a selection has not been made.

Rule A.4-02:
Code = 9 (Infinity) indicates that the onscreen keyboard should repeat its scan cycle indefinitely until a selection is made.

A.5 Braille Dot Number Vocabulary Codes

The 2 basic “braille dot number” values are:

- 6
- 8

The coding convention for the “braille dot number” vocabulary is presented in Table A.5.

Table A.5 Codes Representing "Braille dot number" Values.

IT Interface		Human Interface / Equivalent Linguistic Expressions			
		ISO English (eng)		ISO French (fra)	
Table ID (1)	Code (2)	Mnemonic (3)	Expression (4)	Mnemonic (5)	Expression (6)
PNP:A5	1	6	6		
PNP:A5	2	8	8		

Rule A.5-01:
Code = 1 (6) implies a Braille cell that uses six (6) dots arranged in two columns of three dots each.

Rule A.5-02:
Code = 2 (8) implies a Braille cell that uses eight (8) dots arranged in two columns of four dots each.

A.6 Braille Grade Vocabulary Codes

The 2 basic "braille grade" values are:

- uncontracted
- contracted

The coding convention for the "braille grade" vocabulary is presented in Table 06.

Table A.6 Codes Representing "braille grade" Values.

IT Interface		Human Interface / Equivalent Linguistic Expressions			
		ISO English (eng)		ISO French (fra)	
Table ID (1)	Code (2)	Mnemonic (3)	Expression (4)	Mnemonic (5)	Expression (6)
PNP:A6	1	U	Uncontracted		
PNP:A6	2	C	Contracted		

RuleA.6-01:
Code = 1 (Uncontracted) refers to a set of Braille symbols that does not include any abbreviations or contractions in addition to a standard alphabet.

Rule A.6-02:
Code = 2 (Contracted) refers to a set of Braille symbols that includes abbreviations and contractions in addition to a standard alphabet.

A.7 Braille Mark Vocabulary Codes

The 6 basic "braille mark" values are:

- highlight
- bold
- underline
- italic
- strikeout
- colour

The coding convention for the "braille mark" vocabulary is presented in Table A.7.

Table A.7 Codes Representing "braille mark" Values.

IT Interface		Human Interface / Equivalent Linguistic Expressions			
		ISO English (eng)		ISO French (fra)	
Table ID (1)	Code (2)	Mnemonic (3)	Expression (4)	Mnemonic (5)	Expression (6)
PNP:A7	1	H	Highlight		
PNP:A7	2	B	Bold		
PNP:A7	3	U	Underline		
PNP:A7	4	I	Italic		
PNP:A7	5	S	Strikeout		
PNP:A7	6	C	Colour		

Rule A.7-01:
If Code = 1 (Highlight) is used, a Braille display will place an extra symbol along side any characters that are highlighted.

Rule A.7-02:
If Code = 2 (Bold) is used, a Braille display will place an extra symbol along side any characters that are bolded.

Rule A.7-03:
If Code = 3 (Underline) is used, a Braille display will place an extra symbol along side any characters that are underlined.

Rule A.7-04:
If Code = 4 (Italic) is used, a Braille display will place an extra symbol along side any characters that are italicized.

Rule A.7-05:
If Code = 5 (Strikeout) is used, a Braille display will place an extra symbol along side any characters that are struck out.

Rule A.7-06:
If Code = 6 (Colour) is used, a Braille display will place an extra symbol along side any characters that use colour.

A.8 Braille Status Cell Vocabulary Codes

The 3 basic "braille status cell" values are:

- off
- left
- right

The coding convention for the "braille status cell" vocabulary is presented in Table A.8.

Table A.8 Codes Representing "braille status cell" Values.

IT Interface		Human Interface / Equivalent Linguistic Expressions			
		ISO English (eng)		ISO French (fra)	
Table ID (1)	Code (2)	Mnemonic (3)	Expression (4)	Mnemonic (5)	Expression (6)
PNP:A8	1	O	Off		
PNP:A8	2	L	Left		
PNP:A8	3	R	Right		

Rule A.8-01:
If Code = 1 (Off) is used, a Braille display will not use any form of status cell.

Rule A.8-02:
If Code = 2 (Left) is used, a Braille display will place a status cell to the left of the main display.

Rule A.8-03:
If Code = 3 (Right) is used, a Braille display will place a status cell to the right of the main display

A.9 Code Termination Signal Vocabulary Codes

The 2 basic "code termination" values are:

- switch
- timed

The coding convention for the "code termination" vocabulary is presented in Table A.9.

Table A.9 Codes Representing "code termination" Values.

IT Interface		Human Interface / Equivalent Linguistic Expressions			
		ISO English (eng)		ISO French (fra)	
Table ID (1)	Code (2)	Mnemonic (3)	Expression (4)	Mnemonic (5)	Expression (6)
PNP:A9	1	S	Switch		
PNP:A9	2	T	Timed		

Rule A.9-01:
If Code = 1 (Switch) is used, a coded input system will wait until the user activates a switch before considering a variable-length code to be complete.

Rule A.9-02:
If Code = 2 (Timed) is used, a coded input system will wait a fixed length of time before considering a variable-length code to be complete.

A.10 Code Vocabulary Codes

The 4 basic “code” values are:

- morse
- quartering
- eight cell
- chordic

The coding convention for the “code” vocabulary is presented in Table A.10.

Table A.10 Codes Representing "code" Values.

IT Interface		Human Interface / Equivalent Linguistic Expressions			
		ISO English (eng)		ISO French (fra)	
Table ID (1)	Code (2)	Mnemonic (3)	Expression (4)	Mnemonic (5)	Expression (6)
PNP:A10	1	M	Morse		
PNP:A10	2	Q	Quartering		
PNP:A10	3	E	Eight Cell		
PNP:A10	4	C	Chordic		

Rule A.10-01:
Code = 1 (Morse) indicates that Morse code will be used for input.

Rule A.10-02:
Code = 2 (Quartering) indicates that a quartering code will be used for input.

Rule A.10-03:
Code = 3 (Eight Cell) that an eight cell code will be used for input.

Rule A.10-04:
Code = 4 (Chordic) that a chordic keyboard will be used for input.

A.11 Components Shown Vocabulary Codes

The 2 basic “components shown” values are:

- list of links
- annotations

The coding convention for the “components shown” vocabulary is presented in Table A.11.

Table A.11 Codes Representing "components shown" Values.

IT Interface		Human Interface / Equivalent Linguistic Expressions			
		ISO English (eng)		ISO French (fra)	
Table ID (1)	Code (2)	Mnemonic (3)	Expression (4)	Mnemonic (5)	Expression (6)
PNP:A11	1	L	List of Links		
PNP:A11	2	A	Annotations		

Rule A.11-01:
Code = 1 (List of Links) refers to the display of a list of all hyperlinks present in a document.

Rule A.11-02:
Code = 2 (Annotations) refers to the display of any annotations associated with a document.

A.12 Content Density Vocabulary Codes

The 2 basic "content density" values are:

- overview
- detailed

The coding convention for the "content density" vocabulary is presented in Table A.12.

Table A.12 Codes Representing "content density" Values.

IT Interface		Human Interface / Equivalent Linguistic Expressions			
		ISO English (eng)		ISO French (fra)	
Table ID (1)	Code (2)	Mnemonic (3)	Expression (4)	Mnemonic (5)	Expression (6)
PNP:A12	1	O	Overview		
PNP:A12	2	D	Detailed		

Rule A.12-01:
Code = 1 (Overview) indicates a summarized presentation of the information contained in a document.

Rule A.12-02:
Code = 2 (Detailed) indicates a full presentation of all information contained in a document.

A.13 Control Flexibility Vocabulary Codes

The 2 basic "control flexibility" values are:

- full keyboard control
- full mouse control

The coding convention for the "control flexibility" vocabulary is presented in Table A.13.

Table A.13 Codes Representing "control flexibility" Values.

IT Interface		Human Interface / Equivalent Linguistic Expressions			
		ISO English (eng)		ISO French (fra)	
Table ID (1)	Code (2)	Mnemonic (3)	Expression (4)	Mnemonic (5)	Expression (6)
PNP:A13	1	K	Full keyboard control		
PNP:A13	2	M	Full mouse control		

Rule A.13-01:
Code = 1 (Full keyboard control) indicates that a resource can be controlled or interacted with using only a keyboard.

Rule A.130-02:
Code = 2 (Full mouse control) indicates that a resource can be controlled or interacted with using only a mouse or other pointing device.

A.14 Controller Window Vocabulary Codes

The 2 basic "controller window" values are:

- hide
- show

The coding convention for the "controller window" vocabulary is presented in Table A14.

Table A.14 Codes Representing "controller window" Values.

IT Interface		Human Interface / Equivalent Linguistic Expressions			
		ISO English (eng)		ISO French (fra)	
Table ID (1)	Code (2)	Mnemonic (3)	Expression (4)	Mnemonic (5)	Expression (6)
PNP:A14	1	H	Hide		
PNP:A41	2	S	Show		

Rule A.14-01:
If Code = 1 (Hide) is used, a voice recognition system should not display a window containing the voice recognition system controls.

Rule A.14-02:
If Code = 2 (Show) is used, a voice recognition system should display a window containing the voice recognition system controls.

A.15 Generic Font Face Vocabulary Codes

The 5 basic "generic font face" values are:

- serif
- sans serif
- monospaced
- cursive
- fantasy

The coding convention for the "generic font face" vocabulary is presented in Table A.15.

Table A.15 Codes Representing "generic font face" Values.

IT Interface		Human Interface / Equivalent Linguistic Expressions			
		ISO English (eng)		ISO French (fra)	
Table ID (1)	Code (2)	Mnemonic (3)	Expression (4)	Mnemonic (5)	Expression (6)
PNP:A15	1	SE	Serif		
PNP:A15	2	SA	Sans Serif		
PNP:A15	3	MO	Monospaced		
PNP:A15	4	CU	Cursive		
PNP:A15	5	FA	Fantasy		

Rule A.15-01:
Code = 1 (Serif) refers to a serif font family.

Rule A.15-02:
Code = 2 (sans Serif) refers to a sans serif font family.

Rule A.15-03:
Code = 3 (Monospaced) refers to a monospaced font family.

Rule A.15-04:
Code = 4 (Cursive) refers to a cursive font family.

Rule A.15-05:
Code = 5 (Fantasy) refers to a fantasy font family.

A.16 Handedness Vocabulary Codes

The 2 basic "handedness" values are:

- left
- right

The coding convention for the "handedness" vocabulary is presented in Table A.16.

Table A.16 Codes Representing "handedness" Values.

IT Interface		Human Interface / Equivalent Linguistic Expressions			
		ISO English (eng)		ISO French (fra)	
Table ID (1)	Code (2)	Mnemonic (3)	Expression (4)	Mnemonic (5)	Expression (6)
PNP:A16	1	L	Left		
PNP:A16	2	R	Right		

Rule A.16-01:
Code = 1 (Left) indicates an input device that is explicitly configured for a left-handed person.

Rule A.16-02:
Code = 2 (Right) indicates an input device that is explicitly configured for a right-handed person.

A.17 Hazard Vocabulary Codes

The 4 basic "hazard" values are:

- flashing
- sound
- olfactory
- motion simulation

The coding convention for the "hazard" vocabulary is presented in Table A.17.

Table A.17 Codes Representing "hazard" Values.

IT Interface		Human Interface / Equivalent Linguistic Expressions			
		ISO English (eng)		ISO French (fra)	
Table ID (1)	Code (2)	Mnemonic (3)	Expression (4)	Mnemonic (5)	Expression (6)
PNP:A17	1	F	Flashing		
PNP:A17	2	S	Sound		
PNP:A17	3	O	Olfactory		
PNP:A17	4	M	Motion simulation		

Rule A.17-01:
If Code = 1 (Flashing) is used, the user should not be presented with any images that flash or blink (flashing or blinking lights are known to cause epileptic seizures in some people).

Rule A.17-02:
If Code = 2 (Sound) is used, the user should not be presented with any content containing sound.

Rule A.17-03:
If Code = 3 (Olfactory) is used, the user should not be presented with any content containing smell.

Rule A.17-04:
If Code = 4 (Motion simulation) is used, the user should not be presented with any content that simulates motion.

A.18 Link Indication Vocabulary Codes

The 4 basic "link indication" values are:

- speak link
- different voice
- sound effect
- none

The coding convention for the "link indication" vocabulary is presented in Table A.18.

Table A.18 Codes Representing "link indication" Values.

IT Interface		Human Interface / Equivalent Linguistic Expressions			
		ISO English (eng)		ISO French (fra)	
Table ID (1)	Code (2)	Mnemonic (3)	Expression (4)	Mnemonic (5)	Expression (6)
PNP:A18	1	S	Speak Link		
PNP:A18	2	D	Different Voice		
PNP:A18	3	E	Sound Effect		
PNP:A18	4	N	None		

Rule A.18-01:
If Code = 1 (Speak Link) is used, the system should speak the word "link" before speaking the link text.

Rule A.18-02:
If Code = 2 (Different Voice) is used, the system should use a different voice from the default voice to speak the link text.

Rule A.18-03:
If Code = 3 (Sound Effect) is used, the system should play a sound effect to indicate that the text is a link.

Rule A.18-04:
If Code = 4 (None) is used, no particular action should be taken to indicate the link.

A.19 Mouse Emulation Device Vocabulary Codes

The 4 basic "mouse emulation device" values are:

- keypad
- keyboard
- switch
- voice

The coding convention for the "mouse emulation device" vocabulary is presented in Table A.19.

Table A.19 Codes Representing "mouse emulation device" Values.

IT Interface		Human Interface / Equivalent Linguistic Expressions			
		ISO English (eng)		ISO French (fra)	
Table ID (1)	Code (2)	Mnemonic (3)	Expression (4)	Mnemonic (5)	Expression (6)
PNP:A19	1	P	Keypad		
PNP:A19	2	K	Keyboard		
PNP:A19	3	S	Switch		
PNP:A19	4	V	Voice		

Rule A.19-01:
If Code = 1 (Keypad) is used, a keypad is used to emulate mouse movements.

Rule A.19-02:
If Code = 2 (Keyboard) is used, a keyboard is used to emulate mouse movements.

Rule A.19-03:
If Code = 3 (Switch) is used, a switch is used to emulate mouse movements.

Rule A.19-04:
If Code = 4 (Voice) is used, voice input is used to emulate mouse movements.

A.20 Navigation Strategy Vocabulary Codes

The 2 basic "navigation strategy" values are:

- breadth first
- depth first

The coding convention for the "navigation strategy" vocabulary is presented in Table A.20.

Table A.20 Codes Representing "navigation strategy" Values.

IT Interface		Human Interface / Equivalent Linguistic Expressions			
		ISO English (eng)		ISO French (fra)	
Table ID (1)	Code (2)	Mnemonic (3)	Expression (4)	Mnemonic (5)	Expression (6)
PNP:A20	1	B	Breadth First		
PNP:A20	2	D	Depth First		

Rule A.20-01:
If Code = 1 (Breadth First) is used, focus should move through content in a breadth-first manner, e.g. through higher-level topics/entries first.

Rule A.20-02:
If Code = 2 (Depth First) is used, focus should move through content in a depth-first manner, e.g. descending down a hierarchy before moving on to the next higher-level item.

A.21 Prediction Type Vocabulary Codes

The 4 basic "prediction type" values are:

- letter
- word
- word completion
- command

The coding convention for the "prediction type" vocabulary is presented in Table A.21.

Table A.21 Codes Representing "prediction type" Values.

IT Interface		Human Interface / Equivalent Linguistic Expressions			
		ISO English (eng)		ISO French (fra)	
Table ID (1)	Code (2)	Mnemonic (3)	Expression (4)	Mnemonic (5)	Expression (6)
PNP:A21	1	L	Letter		
PNP:A21	2	W	Word		
PNP:A21	3	C	Word Completion		
PNP:A21	4	M	Command		

Rule A.21-01:
If Code = 1 (Letter) is used, the software should predict which letter a user is likely to type next.

Rule A.21-02:
If Code = 2 (Word) is used, the software should predict which word a user is likely to type next.

Rule A.21-03:
If Code = 3 (word Completion) is used, the software should predict what word the user may be typing, based on the letters typed so far, while a user is typing a word.

Rule A.21-04:
If Code = 4 (Command) is used, the software should predict which command a user is likely to be entering.

A.22 Reading Unit Vocabulary Codes

The 4 basic "reading unit" values are:

- word
- line
- sentence
- paragraph

The coding convention for the "reading unit" vocabulary is presented in Table A.22.

Table A.22 Codes Representing "reading unit" Values

IT Interface		Human Interface / Equivalent Linguistic Expressions			
		ISO English (eng)		ISO French (fra)	
Table ID (1)	Code (2)	Mnemonic (3)	Expression (4)	Mnemonic (5)	Expression (6)
PNP:A22	1	W	Word		
PNP:A22	2	L	Line		
PNP:A22	3	S	Sentence		
PNP:A22	4	P	Paragraph		

Rule A.22-01:
If Code = 1 (Word) is used, the system should highlight each word of the text in turn.

Rule A.22-02:
If Code = 2 (Line) is used, the system should highlight each line of the text in turn.

Rule A.22-03:
If Code = 3 (Sentence) is used, the system should highlight each sentence of the text in turn.

Rule A.22-04:
If Code = 4 (Paragraph) is used, the system should highlight each paragraph of the text in turn.

A.23 Representation Form Vocabulary Codes

The 12 basic "representation form" values are:

- enhanced
- verbatim
- real-time
- transcript
- alternative text
- long description
- sign language
- image-based
- symbolic
- recorded
- synthesized
- haptic

The coding convention for the "representation form" vocabulary is presented in Table A.23.

Table A.23 Codes Representing "representation form" Values.

IT Interface		Human Interface / Equivalent Linguistic Expressions			
		ISO English (eng)		ISO French (fra)	
Table ID (1)	Code (2)	Mnemonic (3)	Expression (4)	Mnemonic (5)	Expression (6)
PNP:A23	01	EN	Enhanced		
PNP:A23	02	VE	Verbatim		
PNP:A23	03	RD	Reduced		
PNP:A23	04	RT	Real-time		
PNP:A23	05	TR	Transcript		
PNP:A23	06	AL	Alternative text		
PNP:A23	07	LO	Long description		
PNP:A23	08	SI	Sign language		
PNP:A23	09	IM	Image-based		
PNP:A23	10	SY	Symbolic		
PNP:A23	11	RE	Recorded		
PNP:A23	12	SZ	Synthesized		
PNP:A23	13	HA	Haptic		

Rule A.23-01:
If Code = 01 (Enhanced) is used, the caption being described is *enhanced*, i.e. it contains extra content such as images, hyperlinks, etc.

Rule A.23-02:
If Code = 02 (Verbatim) is used, the caption being described is a verbatim caption.

Rule A.23-03:
If Code = 03 (Reduced) is used, the caption being described uses language at a reduced reading level.

Rule A.23-04:
If Code = 04 (Real-time) is used, the caption being described is a real-time captions.

Rule A.23-05:
If Code = 05 (Transcript) is used, the text representation being described is a transcript of the original audio.

Rule A.23-06:
If Code = 06 (Alternative text) is used, the text representation being described is an "alt text" description of the original image, as used by the "alt" attribute of an HTML "img" tag.

Rule A.23-07:
If Code = 07 (Long description) is used, the text representation being described is a long textual description of the original image, as used by the "longdesc" attribute of an HTML "img" tag.

Rule A.23-08:
If Code = 08 (Sign language) is used, the visual representation being described is a sign language interpretation of the original access mode.

Rule A.23-09:
If Code = 09 (Image-based) is used, the visual representation being described is an image-based representation of the original access mode.

Rule A.23-10:
If Code = 10 (Symbolic) is used, the visual representation being described is a symbolic representation of the original access mode.

Rule A.23-11:
If Code = 11 (Recorded) is used, the audio representation being described is a recorded voice.

Rule A.23-12:
If Code = 12 (Synthesized) is used, the audio representation being described is a synthesized voice.

Rule A.23-13:
If Code = 13 (Haptic) is used, the tactile representation being described is a haptic resource.

A.24 Selection Method Vocabulary Codes

The 2 basic "selection method" values are:

- point-and-dwell
- point-and-click

The coding convention for the "selection method" vocabulary is presented in Table A.24.

Table A.24 Codes Representing "selection method" Values.

IT Interface		Human Interface / Equivalent Linguistic Expressions			
		ISO English (eng)		ISO French (fra)	
Table ID (1)	Code (2)	Mnemonic (3)	Expression (4)	Mnemonic (5)	Expression (6)
PNP:A24	1	D	Point-And-Dwell		
PNP:A24	2	C	Point-And-Click		

Rule A.24-01:
Code = 1 (Point-And-Dwell) indicates a selection method in which the user selects an item by pointing at it with a pointing device and continuing to point at it for a particular length of time.

Rule A.24-02:
Code = 2 (Point-And-Click) indicates a selection method in which the user selects an item by pointing at it with a pointing device and activates a button or switch to select the item.

A.25 Speech Component Vocabulary Codes

The 2 basic "speech component" values are:

- alternative text
- controls when tabbing

The coding convention for the "speech component" vocabulary is presented in Table A.25.

Table A.25 Codes Representing "speech component" Values.

IT Interface		Human Interface / Equivalent Linguistic Expressions			
		ISO English (eng)		ISO French (fra)	
Table ID (1)	Code (2)	Mnemonic (3)	Expression (4)	Mnemonic (5)	Expression (6)
PNP:A25	1	A	Alternative Text		
PNP:A25	2	C	Controls When Tabbing		

Rule A.25-01:
If Code = 1 (Alternative Text) is used, the system should speak any alternative text encountered.

Rule A.25-02:
If Code = 2 (Controls When Tabbing) is used, the system should speak the names of input controls as the user tabs through them.

A.26 Support Tool Vocabulary Codes

The 10 basic "support tool" values are:

- dictionary
- calculator
- note taking
- peer interaction
- abacus
- thesaurus
- spell checker
- homophone checker
- mind mapping software
- outline tool

The coding convention for the "support tool" vocabulary is presented in Table A.26.

Table A.26 Codes Representing "support tool" Values.

IT Interface		Human Interface / Equivalent Linguistic Expressions			
		ISO English (eng)		ISO French (fra)	
Table ID (1)	Code (2)	Mnemonic (3)	Expression (4)	Mnemonic (5)	Expression (6)
PNP:A26	01	D	Dictionary		
PNP:A26	02	C	Calculator		
PNP:A26	03	N	Note Taking		
PNP:A26	04	P	Peer Interaction		
PNP:A26	05	A	Abacus		
PNP:A26	06	T	Thesaurus		
PNP:A26	07	S	Spell Checker		
PNP:A26	08	H	Homophone Checker		
PNP:A26	09	M	Mind Mapping Software		
PNP:A26	10	O	Outline Tool		

Rule A.26-01:
Code = 01 (Dictionary) indicates the use of a dictionary.

Rule A.26-02:
Code = 02 (Calculator) indicates the use of a calculator.

Rule A.26-03:
Code = 03 (Note Taking) indicates the use of note taking.

Rule A.26-04:
Code = 04 (Peer Interaction) indicates the use of a peer interaction system.

Rule A.26-05:
Code = 05 (Abacus) indicates the use of an abacus.

Rule A.26-06:
Code = 06 (Thesaurus) indicates the use of a thesaurus.

Rule A.26-07:
Code = 07 (Spell checker) indicates the use of a spell-checking tool.

Rule A.26-08:
Code = 08 (Homophone Checker) indicates the use of a homophone-checking tool.

Rule A.26-09:
Code = 09 (Mind Mapping Software) indicates the use of mind mapping software.

Rule A.26-10:
Code = 10 (Outline Tool) indicates the use of an outlining tool.

A.27 Switch Function Vocabulary Codes

The 3 basic “switch function” values are:

- select
- cancel
- scan

The coding convention for the “switch function” vocabulary is presented in Table A.27.

Table A.27 Codes Representing “switch function” Values

IT Interface		Human Interface / Equivalent Linguistic Expressions			
		ISO English (eng)		ISO French (fra)	
Table ID (1)	Code (2)	Mnemonic (3)	Expression (4)	Mnemonic (5)	Expression (6)
PNP:A27	1	SE	Select		
PNP:A27	2	CA	Cancel		
PNP:A27	3	SC	Scan		

Rule A.27-01:
If Code = 1 (Select) is used, the selected switch is to be mapped to the ‘select’ function of the user interface.

Rule A.27-02:
If Code = 2 (Cancel) is used, he selected switch is to be mapped to the ‘cancel’ function of the user interface.

Rule A.27-03:
If Code = 1 (scan) is used, he selected switch is to be mapped to the ‘scan’ function of the user interface.

A.28 Switch Port Vocabulary Codes

The 7 basic “switch port” values are:

- ps/2
- game
- serial
- usb
- firewire
- infrared
- bluetooth

The coding convention for the “switch port” vocabulary is presented in Table A.28.

Table A.28 Codes Representing "switch port" Values.

IT Interface		Human Interface / Equivalent Linguistic Expressions			
		ISO English (eng)		ISO French (fra)	
Table ID (1)	Code (2)	Mnemonic (3)	Expression (4)	Mnemonic (5)	Expression (6)
PNP:A28	1	P	Ps/2		
PNP:A28	2	G	Game		
PNP:A28	3	S	Serial		
PNP:A28	4	U	Usb		
PNP:A28	5	F	Firewire		
PNP:A28	6	I	Infrared		
PNP:A28	7	B	Bluetooth		

Rule A.28-01:
If Code = 1 (Ps/2) is used, the switch is connected to the computer's PS/2 port.

Rule A.28-02:
If Code = 2 (Game) is used, the switch is connected to the computer's game port.

Rule A.28-03:
If Code = 3 (Serial) is used, the switch is connected to the computer's serial port.

Rule A.28-04:
If Code = 4 (Usb) is used, the switch is connected to the computer's USB port.

Rule A.28-05:
If Code = 5 (Firewire) is used, the switch is connected to the computer's Firewire port.

Rule A.28-06:
If Code = 6 (Infrared) is used, the switch is connected to the computer's infrared port.

Rule A.28-07:
If Code = 7 (Bluetooth) is used, the switch is connected to the computer using Bluetooth.

A.29 System Sounds Vocabulary Codes

The 3 basic "system sounds" values are:

- desktop
- window
- caption bar

The coding convention for the "system sounds" vocabulary is presented in Table A.29.

Table A.29 Codes Representing "system sounds" Values.

IT Interface		Human Interface / Equivalent Linguistic Expressions			
		ISO English (eng)		ISO French (fra)	
Table ID (1)	Code (2)	Mnemonic (3)	Expression (4)	Mnemonic (5)	Expression (6)
PNP:A29	1	D	Desktop		
PNP:A29	2	W	Window		
PNP:A29	3	C	Caption Bar		

Rule A.29-01:
If Code = 1 (Desktop) is used, the desktop should be flashed to indicate the occurrence of any system sounds.

Rule A.29-02:
If Code = 2 (Window) is used, the current window should be flashed to indicate the occurrence of any system sounds.

Rule A.29-03:
If Code = 3 (Caption Bar) is used, the caption bar (if present) should be flashed to indicate the occurrence of any system sounds.

A.30 Tracking Vocabulary Codes

The 3 basic "tracking" values are:

- mouse
- caret
- focus

The coding convention for the "tracking" vocabulary is presented in Table A.30.

Table A.30 Codes Representing "tracking" Values

IT Interface		Human Interface / Equivalent Linguistic Expressions			
		ISO English (eng)		ISO French (fra)	
Table ID (1)	Code (2)	Mnemonic (3)	Expression (4)	Mnemonic (5)	Expression (6)
PNP:A30	1	M	Mouse		
PNP:A30	2	C	Caret		
PNP:A30	3	F	Focus		

Rule A.30-01:
If Code = 1 (Mouse) is used, the magnification system should track the user's mouse movements.

Rule A.30-02:
If Code = 2 (Caret) is used, the magnification system should track the text caret.

Rule A.30-03:
If Code = 2 (Focus) is used, the magnification system should track the screen component that currently has focus.

A.31 Usage Vocabulary Codes

The four basic "usage" values are:

- required
- preferred
- optionally use
- prohibited

The coding convention for the "usage" vocabulary is presented in Table A31.

Table A.31 Codes Representing "usage" Values.

IT Interface		Human Interface / Equivalent Linguistic Expressions			
		ISO English (eng)		ISO French (fra)	
Table ID (1)	Code (2)	Mnemonic (3)	Expression (4)	Mnemonic (5)	Expression (6)
PNP:A31	1	REQ	Required		
PNP:A31	2	PRE	Preferred		
PNP:A31	3	OPT	Optionally Use		
PNP:A31	4	PRO	Prohibited		

Rule A.31-01:
If Code = 1 (Required) is used, the user cannot use content or tools that do not provide this feature or allow this transformation.

Rule A.31-02:
If Code = 2 (Preferred) is used, the user prefers content or tools that provide this feature or allow this transformation.

Rule A.31-03:
If Code = 3 (Optionally Use) is used, the user would use this setting if the content or tool they have selected for other reasons provides or allows it.

Rule A.31-04:
Code = 4 (Prohibited) is used, the user cannot use content or tools that include this feature or require this transformation; this feature should be turned off if possible, or content that includes this feature should not be offered.

A.32 Vocabulary Vocabulary Codes

The 2 basic “vocabulary” values are:

- contextual
- natural

The coding convention for the “vocabulary” vocabulary is presented in Table A.32.

Table A.32 Codes Representing “vocabulary” Values

IT Interface		Human Interface / Equivalent Linguistic Expressions			
		ISO English (eng)		ISO French (fra)	
Table ID (1)	Code (2)	Mnemonic (3)	Expression (4)	Mnemonic (5)	Expression (6)
PNP:A32	1	C	Contextual		
PNP:A32	2	N	Natural		

Rule A.32-01:
If Code = 1 (Contextual) is used, the voice recognition vocabulary being described is a contextual vocabulary.

Rule A.32-02:
If Code = 2 (Natural) is used, the voice recognition vocabulary being described is a natural language vocabulary.

A.33 Window Layout Vocabulary Codes

The 2 basic “window layout” values are:

- tiled
- overlap

The coding convention for the "window layout" vocabulary is presented in Table A.33.

Table A.33 Codes Representing “window layout” Values.

IT Interface		Human Interface / Equivalent Linguistic Expressions			
		ISO English (eng)		ISO French (fra)	
Table ID (1)	Code (2)	Mnemonic (3)	Expression (4)	Mnemonic (5)	Expression (6)
PNP:A33	1	T	Tiled		
PNP:A33	2	O	Overlap		

Rule A.33-01:
If Code = 1 (Tiled) is used, the system should arrange new windows so that all windows are showing simultaneously.

Rule A.33-02:
If Code = 2 (Overlap) is used, the system should arrange new windows so that windows are offset but overlapping each other, with only the top window fully visible.

Annex B Recommended Default Values

The following is a list of recommended default values for the learner needs and preferences settings.

Table B.1 List of recommended defaults.

Attribute	Recommended Default Value
alphanumeric keyboard layout	Standard [24751-2:03 1]
automatic delay	true
automatic repeat rate	0.5
automatic scan initial delay	0.0
automatic scan repeat	1
background colour	(operating system setting)
braille dot pressure	0.5
braille grade	Uncontracted [24751-2:06 1]
braille status cell	Off [24751-2:08 1]
code	Morse [24751-2:10 1]
code rate	3
code termination signal	Switch [24751-2:09 1]
colour coding avoidance	false
components shown	Annotations [24751-2:11 2]
confirmation feedback	true
content density	Overview [24751-2:12 1]
controller window	Show [24751-2:14 2]
cursor acceleration	0.5
cursor colour	(operating system setting)
cursor size	0.5
cursor speed	0.5
cursor trails	0.5
dictation	false
double-click speed	0.4
debounce interval	0.5
device handedness	Right [24751-2:16 2]
dwell time	0.5
enhanced caption	false
font size	12.0

Attribute	Recommended Default Value
foreground colour	(operating system setting)
generic font face	Sans Serif [24751-2:15 2]
highlight colour	(operating system setting)
highlight	Word [24751-2:22 1]
invert colour choice	false
invert images	false
key height absolute	10
key height relative	3
key width absolute	10
key width relative	4
key selection sound feedback	true
key spacing absolute	0
key spacing relative	0
language	(operating system setting)
link colour	(operating system setting)
link indication	Speak link [24751-2:18 1]
magnification	1.0
microphone gain	0.5
modifier indication	true
mouse emulation device	Keypad [24751-2:19 1]
mouse control	true
navigation strategy	Depth First [24751-2:20 1]
number of braille cells	80
number of braille dots	6 [24751-2:05 1]
number of inputs	2
number of prediction choices displayed	5
prediction type	Word completion [24751-2:21 3]
pitch	0.5
reading rate	120
reading unit	Word [24751-2:22 1]
reduced reading level	false
scan speed	1.0
scan switch delay	0.0
selection method	Point-and-Click [24751-2:24 2]

Attribute	Recommended Default Value
slow keys interval	0.2
speech component	Alternative Text [24751-2:25 1] Controls When Tabbing [24751-2:25 2]
speech rate	180
switch function	Select [24751-2:27 1]
switch delay	0.0
switch port	USB [24751-2:28 4]
system sounds caption	false
table of contents	true
tracking	Mouse [24751-2:30 1] Caret [24751-2:30 2] Focus [24751-2:30 3]
usage	Preferred [24751-2:31 2]
vocabulary	Contextual [24751-2:32 1]
volume	0.5
window layout	Tiled [24751-2:33 1]

Annex C Bindings and Implementations

The following bindings are available or in development for the IMS Learner Information Package Accessibility for LIP - Version 1 [ACCLIP] that serves as the reference specification for this standard.

1. IMS Learner Information Package Accessibility for LIP XML Binding, <http://imsglobal.org/accessibility>

Implementations:

1. The Inclusive Learning Exchange (TILE): <http://inclusivelearning.ca/>
2. Web4All: < http://web4all.ca/>

The following project is developing a Java binding for this standard.

1. CulturAll (TransformAble sub-project): http://culturall.atrc.utoronto.ca/

Annex D Scenarios

D.1 Administration Scenario

D.1.1 Background Information

In many situations, it is the responsibility of a system administrator or human resources specialist to create and sometimes modify a user's learning profile. This case describes the creation of a new learner profile focusing on initial accessibility needs. This profile is later modified to reflect additional information.

This scenario is essentially the same one describing how a user would create their own learner profile and modify it to meet their particular accessibility needs.

D.1.2 Use Case

Beth is a human resources specialist in a large university that delivers much of its education via the Internet. Once a student is enrolled, Beth sets up their initial account information. She uses a copy of a paper form submitted by the student (in this case, "Dan") that contains basic student demographic information and can contain information about any disabilities the student has.

Beth logs into the administration system using her user name and password. Beth is a recognized user with administration privileges and the administration console is displayed (Admin Console). Beth prefers to view larger text than is typical for these applications. She uses a high-resolution display with a finer than normal dot pitch. It allows more information to be displayed on the screen but it can make things hard to read. Beth overcomes this with her own accessibility preference settings.

From the Admin Console, Beth selects the Create New User option. This displays a form prompting for a new user name and other demographic information. Beth enters Dan's information from the paper copy provided for him. The form is submitted and Dan is created as a new user in the Virtual Learning Environment system. A password is automatically created for Dan, which Beth notes.

Using the information provided, Beth observes that Dan is deaf. She invokes the Create Accessibility Preferences function from the Admin Console. This function prompts her for Dan's user name and password, which she supplies. Beth has the choice at this point of creating a detailed set of accessibility needs and preferences for Dan or using one of the default templates that the system provides. Since she doesn't have much information about Dan's preferences, she selects a template that causes alternatives to sound to be presented, should they be available for a particular piece of content. Once he receives his password information, Dan can alter his settings to reflect his needs and preferences anytime he logs into the system.

D.1.3 Transaction Analysis

This analysis is intended to determine what information is collected and provided by services associated with a hypothetical Learner Profile Manager defined under the guidelines established by the IMS Abstract Framework.

D.1.3.1 Admin - Create New User

1 User logs onto the university's administration system;
2 Verify that user is an administrator with appropriate access levels;
3 Admin console requests LIP preferences – user has larger type preferences;
4 Admin configures for larger type;
5 Admin console is displayed;
6 Access to Create New User function is initiated;
7 Create New User form is adjusted to display in larger type;
8 Create New User form is delivered to user;
9 Information on new student is entered;
10 Form is submitted;
11 New profile is created for student.

D.1.3.2 Admin - Add Accessibility Profile Template

1 Access to Create Accessibility Preferences is initiated;
2 Prompt for student name and password is formatted for larger type;
3 Prompt for student name and password is displayed;
4 Prompt for Create New Accessibility Preference or Use Template is formatted for larger type;
5 Prompt for New or Template is displayed;
6 Select Template;
7 Form to select template type is formatted for larger type;
8 Form to select template type is displayed;
9 Select template type;
10 Default accessibility preferences are added to student profile based on template selected.

D.2 Department of Labor Scenario

D.2.1 Background Information

Three mining engineering students are underground in protective clothing (overalls, gloves and goggles) in a wet, noisy mine. They are learning to manipulate a valve to control water flow in a cooling system. They need to synchronize information from a pressure gauge, from someone who is driving the machinery and from the instructional system. They are using a textual/visual display, and a large joy-stick mouse to access the same instructions they used yesterday in a standard classroom/laboratory on a desktop PC. There is a pressure device attached to the computer.

The instructional system authors have created an application that students can use to record preferences for their interaction with the instructional system. The students can create a profile set with a number of profiles e.g., to account for long-term morning and afternoon differences. It will be available on the system and can be amended by each student, temporarily or permanently, and may exist in multiple versions, e.g., to account for long-term morning and afternoon differences.

In addition, the authors have provided a range of profiles that anticipate students' inability to use sound, vision, colour, or other display attributes. Content is likewise made available in a range of modes (such as video, audio and text).

D.2.2 Scenario

The first step is for the students to set up the system for the day's lesson. One student has special needs with respect to his hearing disability. His profile states that he prefers information presented in sign language instead of audio. Another student is colour-blind. Neither of these students expects to have to inform the system of these things at the time of use, and when they, as a group, are setting up the system for all three of them to use, it is important that this information is invisibly transferred to the system when they notify the system they will be working in a group. Each of these three students has a registered learner profile but they will be working together so the system creates a 'group' accessibility profile that will work for all of them.

Following the group accessibility profile, the system changes the display to large yellow on a black background, alters the controls for gross movement navigation suitable to the joystick, and avoids audio output. The system finds the chosen navigation information and an appropriate textual equivalent for the audio stream. The system renders only the selected content in the selected format.

The students interact with the system to customize it for the exercise and machinery they are using. They use the joystick and screen sliders to indicate numerical information for data input and a screen keyboard for machinery type and model. In addition, they place the pressure probe into the water stream.

The system instructs them, providing textual instructions, until the pressure builds up to a dangerous level, a condition they do not recognize. They need help. A bright light on the probe alerts them to the problem and they close down the valve and read the instructions again before repeating the exercise. The second time they manage to maintain the correct pressure levels for the required time. The system records their activity.

The students return to the standard classroom the next day, using the system again in 'group' mode to write up their experiences by annotating the activity report. The group accessibility profile is amended because they are now at a

standard PC rather than using the joy-stick-controlled mine computer, so the control settings should be returned to normal. Both audio and visual outputs are used to meet the needs of the hearing impaired student as well as the others in his group.

D.3 NETg Scenario: Player Preferences

D.3.1 Background Information

NETg's training software incorporates many accessibility features that a learner can manually set so that they get the appropriate learning environment for their abilities and preferences. This scenario describes how the NETg software could read the appropriate information from an IMS Learner Information Profile, and set the appropriate options automatically.

D.3.2 Scenario

Although he has used various forms of learning technology before, Sam is a new NETg user and has an IMS Learner Profile that catalogs his preferences. Although Sam does not have a hearing disability, he finds computer audio distracting, and so prefers to use on-screen-text instead of audio. Accordingly, his Learner Profile indicates this preference, along with the rest of his display and input preferences.

When Sam opens the NETg player, he enters his username and password. The NETg player communicates the login information to the controlling LMS, and also asks the LMS if Sam has an available learner profile. The LMS locates Sam's profile, and forwards the data to the NETg player (note that whether Sam's profile is local to the LMS or located on a profile server is not relevant to the functioning of this scenario).

When the NETg player receives Sam's profile, it reads the profile, and automatically sets preferences to correspond to the preferences expressed in Sam's profile. Thus, the player automatically turns off the sound, and sets itself to use onscreen text instead, as well as automatically conforming to the rest of Sam's preferences.

D.4 PEARL Scenario

D.4.1 Background Information

The PEARL project (Practical Experimentation by Accessible Remote Learning) is operating at the Open University in the UK. The project has developed a framework by which remote control of laboratories for science and engineering subjects can be offered to students anywhere over the WWW. One of the motivations for doing this was to promote the increased participation of disabled students in these subjects. Hence accessibility has been a priority for the project.

The project has implemented a system with user interfaces that are generated "on the fly" from XML descriptions of all the interface elements and the type of interaction they support. The developers have begun to explore an extension to this in which the "interface generator" is also given an XML description of the learner and the way they prefer to use their computer. This learner description has been based on the draft IMS LIP <accessForAll> element and its sub-elements.

This makes it possible to optimize the interface for individual users to take into account, as examples, assistive technology requirements or the fact that users are working hands-free or using a PDA. Further research is needed to define the "rule base" that will specify an interface given a generic description of the interface elements and a user profile.

D.4.2 Scenario

Jenny and Michael are both students at a large university. Jenny is blind but fully mobile whereas Michael has severe motor impairments that affect both his dexterity and mobility.

Jenny goes into a central computer facility to check her schedule for the week and pick up her new assignments. She logs onto the university's VLE (virtual learning environment). As she is an established student, the VLE has a store of Jenny's learner information profile (LIP). The system knows that she is a non-visual computer user. Therefore, all graphics are rendered as alternative text. The local PC also accesses her LIP information and activates and configures the pre-installed screen-reader software to her preferences for her.

Michael, because of his mobility problems, prefers to work from home from his specially adapted PC. He is a switch user (uses two switches to select from highlighted symbols on a virtual keyboard instead of using a standard

keyboard). He logs into the VLE at the beginning of the week to check his schedule etc. by dial-up connection. Similarly the VLE accesses Michael's LIP and configures the content presentation to suit the way he uses the computer. The VLE is fully accessible and it uses the information in the LIP to determine that Michael requires keyboard shortcuts for all menu options and configures the menus on his virtual keyboards accordingly. It is also cognizant of the fact that Michael can only see the top 2/3 of his screen because his virtual keyboard occupies the lower 1/3.

One of Michael's lessons for the week is a remote lab session. Here he has to work in collaboration with other students working at their computers. This is a PEARL laboratory session and this application has been developed to take the information from the LIP and optimize the user interface for each user. The PEARL application also uses information about the students' hardware (interrogated directly) for the PC to be able to optimize the user interface each time a user accesses the remote lab facility. This information includes available screen size and pixel resolution as well as the bandwidth available across the remote link. Michael is able to participate in the lab sessions for his science course from his own home.

D.4.3 Additional Information

Information about the PEARL project is available from <http://kmi.open.ac.uk/projects/pearl>

D.5 PIVoT Scenario

D.5.1 Background Information

Mary is a physics student at MIT who is blind. Mary is registered for an introductory physics course in Classical Mechanics, which is one of the most challenging core courses required for graduation from MIT.

D.5.2 Scenario

After enrolling in the course, Mary learns that as a supplement to this classroom-based course, all of the professor's lectures and portions of the course textbook are available to students enrolled in the course via the web through PIVoT (Physics Interactive Video Tutor). Using streaming digital video and the Internet, PIVoT gives students access to an online textbook, FAQs, physics simulations, practice problems, and a "Personal Tutor" which is an intelligent agent that provides individualized help based on each user's navigation through the web site.

PIVoT gives students instant access to their professor through a collection of digital video clips in which the professor explains difficult concepts, demonstrates physics principles, steps through problem solutions, and answers students' most frequently asked questions (FAQs). PIVoT also offers 35 lectures by the professor via streaming media.

The first time Mary visits the PIVoT website using JAWS, a screen reading software, she logs in via an accessible log-in screen. She is then prompted to set up her user preferences. The preferences she can indicate in PIVoT include audio descriptions for recorded lectures (including equations in MathSpeak, an easy-to-learn language for articulating mathematical concepts), closed captions for recorded lectures, described textbook graphics (utilizing alt-text tags, D-links and longdesc with graphics). The preferences Mary selects will be applied to the delivery of the course material each time she logs into the PIVoT site, regardless of where she is when she logs in.

Planetary Data is the first topic Mary decides she needs additional information about to prepare for her upcoming quiz. There are 3 videos and 2 sections from a chapter in the textbook related to this topic. Since she requires audio descriptions based on her user profile, when she begins to play the first video of the professor's lecture, in addition to hearing his lecture she hears audio descriptions of the complex equations he is drawing.

After listening to the videos, Mary begins to read the textbook sections. She hears the textual portions spoken aloud via her screen reading software. When her screen reading software encounters graphics or equations, she hears the accompanying descriptions of the non-textual visual elements of the textbook.

D.5.3 Additional Information

Information about the PIVoT project is available from < http://web.mit.edu/8.01/www/Fall03/pivot.html>

D.6 Web-4-All Scenario

D.6.1 Background Information

The Web-4-All project is a collaboration between the Adaptive Technology Resource Centre and the Web Accessibility Office of Industry Canada to help meet the public Internet access needs of Canadians with disabilities and literacy issues. Web-4-All combines hardware and software to quickly configure a public access computer to accommodate the special needs of a user and then reverts back to a standard setting for the next user. The needs of users may include: personalized setup of browser, choice of assistive technology and system settings at a multi-user workstation, and a portable preference set.

Challenges faced by Web-4-All included the lack of technical support at the public access centres and the need for a quick way to change the residual settings for one user and then the next, minimizing conflict between different assistive technologies.

D.6.2 Scenario

Mrs. Smith is 70 years old. She is slowly losing her visual acuity to the extent that she requires text to be magnified 4 times. She uses the Industry Canada Community Access Program workstation site to exchange pictures with her grandchildren, to plan her travels and research medical information about her husband's illness. Together with an assistant, Mrs. Smith sets up her preferences by answering a series of functional questions. The resulting preferences are expressed as a LIP specification with accessibility extensions that is saved to a portable storage device (such as a Smart Card). Once this is done, Mrs. Smith can take this portable device to any Community Access Program workstation and cause the browser, system preferences and assistive technologies to adjust to her individual preferences. She can adjust these preferences at any time (i.e., if she forgot her corrective lenses, etc.).

Mrs. Smith takes the same portable preference set to the public access facility at her local college to take a French course offered using a major learning management system (LMS). The LMS responds to the LIP specification instance by adjusting the display of the content according to Mrs. Smith's preferences.

D.6.3 Additional Information

Information about the Web-4-All project is available from < http://www.web4all.ca/>

Annex E Implementation Example

A user manual for an example of a helper software application that assists users in creating a PNP file can be found at: <http://web4all.atrc.utoronto.ca/PW_demo/Demo/Web4All_AdminUser_Manual_Final(08,05,03).doc> The following is an excerpt from that manual.

Display Preferences:

The Display Preferences dialog enables users to modify the presentation of onscreen Web content and make it more accessible to individuals with special needs. The following checkbox options are associated with this dialog:

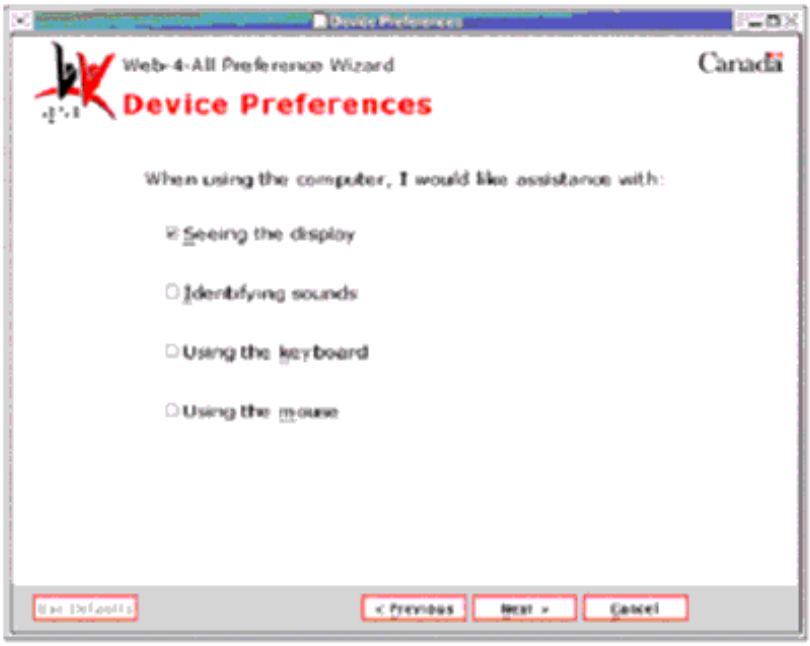
1) **"Make text and the cursor easier to see."** – the first checkbox option allows users with low vision to make the onscreen display easier to see either through the use of a screen magnifier or by increasing font size, improving colour contrast, etc.

2) **"Highlight text and read it to me."** – checkbox two enables clients to have text highlighted and then read to them via a speech synthesizer;

3) **"Read the screen to me."** – the third checkbox allows users to set specific preferences for Web-4-All's default screen reader.

4) **"Let me use a Braille display."** – selecting this checkbox enables users to have online content converted into Braille.

5) **"Show visual alerts."** – this last checkbox allows those with a hearing impairment to have all computer sounds converted into visual signals and/or captions.



After selecting the appropriate Display Preference checkboxes, choose "Control Settings" to advance to the Control Preferences page. To return to the language preferences dialog, select "Previous". To exit Web-4-All, select "Cancel".

Annex F List of Contributors

Contributors to this version of the specification from ISO/IEC include:

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- François Mouzard and M. Janice Pereira for work on the French language version;
- Madeleine Rothberg, WGBH;
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About This Document

Title:	Access For All Digital Personal Needs and Preferences Description for Digital Delivery Information Model
Co-chairs:	Richard Schwerdtfeger (IBM, USA) and Madeleine Rothberg (WGBH National Center for Accessible Media, USA)
Editor:	Colin Smythe (IMS GLC, UK)
Summary:	The Access For All Specification is intended to meet the needs of learners with disabilities and anyone who is disabled by their context. This part of the Access For All Specification provides a common information model for describing the learner or user needs and preferences when accessing digitally delivered resources or services. This model divides the personal needs and preferences of the learner or user into three categories: Display – how resources are to be presented and structured; Control – how resources are to be controlled and operated; and, Content – what supplementary or alternative resources are to be supplied.
Version:	2.0
Version Date:	30 April 2010
Release:	1.0
Status:	**Final Release**
Revision Information:	Supersedes v1.0 which was published in July 2004. This document is based upon the original ISO/IEC 24751-2:2008 *Information technology — Individualized adaptability and accessibility in e-learning, education and training — Part 2: "Access For All Personal Needs and Preferences Description for Digital Delivery"*. The ISO/IEC 24751-2:2008 document was a further development of the original IMS GLC Access For All Learner Information Package, July 2003. Several documentation changes have been made to the ISO/IEC but the technical solution is faithfully reproduced.
Purpose:	This document is for public release. Please provide feedback to the Project Group via IMS GLC Accessibility Forum at http://www.imsglobal.org/community/forum/categories.cfm?catid=54.
Document Location:	http://www.imsglobal.org/accessibility/index.html

Revision History

Version No.	Release Date	Comments
Final Release v1.0	12 July 2004	This is the formal Final Specification of the IMS Access For All Learner Information Package Information Model.
Final Release v2.0	30 April 2010	This is the formal Final Specification of the IMS Access For All Personal Needs and Preferences for Digital Delivery Information Model.

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