- Interactive Schema - Element Dictionary

- Schema: Interactive
- Version: 0.2
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The following is a conceptual framework for representing questionnaires designed as an XCCDF (eXtensible Common Checklist Description Format) checking system. Each structure is described in detail to provide the necessary information on what each represents.

This document is originally developed by David Waltermire (The Center for Internet Security). It is intended for developers and assumes familiarity with XML.

< interactive >

The Interactive element holds all the content of an interactive schema instance. It contains information about one or more questionnaires and results that can be associated with an XCCDF rule by a check reference.

Attributes:

- scope   n/a   (optional -- default='FULL')

Child Elements	Type	MinOccurs	MaxOccurs
generator	inter:GeneratorType	1	1
inter:questionnaire	[extends] inter:CompoundTestActionType	1	unbounded
inter:test_action	inter:ItemBaseType	1	unbounded
inter:question	inter:QuestionType	1	unbounded
inter:results	n/a	0	1

< questionnaire >

A Questionnaire represents an XCCDF check containing references to TestActions that must be evaluated to determine compliance. TestActions may be nested and aggregated thru some acceptable operation to produce the result of a check.

Attributes:

- id   inter:QuestionnaireIDPattern   (required)
- priority   inter:PriorityType   (optional -- default='LOW')
- abstract   xsd:boolean   (optional -- default='false')

< question >

Type: inter:QuestionType

A Question contains information of one particular issue that needs to be answered by a user. It can either be Boolean, Choice, Numeric, or String Quesiton depending on the set of acceptable answers.

< boolean_question >

Substitution Group: inter:question

A BooleanQuestion is a type of Question that elicit response of either {TRUE, FALSE} or {YES, NO}. An optional UNKNOWN value may also be accepted.

Attributes:

- default_answer   xsd:boolean   (optional)
- model   n/a   (optional -- default='MODEL_YES_NO')

< choice_question >

Substitution Group: inter:question

A ChoiceQuestion is a type of Question with one or more acceptable answers specified by the author.

Attributes:

| | - | default_answer_ref | inter:ChoiceIDPattern | (required) |

Child Elements	Type	MinOccurs	MaxOccurs
inter:choice	n/a	1	unbounded

< numeric_question >

Substitution Group: inter:question

A NumericQuestion is a type of Question that requires a numeric answer. An optional acceptable range may be specified.

Attributes:

- default_answer   xsd:decimal   (optional)

< string_question >

Substitution Group: inter:question

A StringQuestion is a type of Question that requires a string answer. An optional acceptable pattern may be specified.

Attributes:

- default_answer   xsd:string   (optional)

< test_action >

Type: inter:ItemBaseType

The TestAction element contains information about what action to take based on the answer to a referenced Question. It can either be Compound_testAction, Boolean_testAction, Choice_testAction, Numeric_testAction, or String_testAction.

< compound_test_action >

Substitution Group: inter:test_action

Type: inter:CompoundTestActionType

A Compound_testAction element holds information about how to aggregate or operate (i.e. AND or OR) on a set of TestActions.

< question_test_action >

Substitution Group: inter:test_action

Type: inter:QuestionTestActionType

A Question_testAction element holds information about the question to test for and the action to take when it has been answered.

< boolean_question_test_action >

Substitution Group: inter:question_test_action

A BooleanQuestion_testAction element holds information about the BooleanQuestion to test for and what to do when it has been answered.

Child Elements	Type	MinOccurs	MaxOccurs
when_true	inter:ResultChoiceType	1	1
when_false	inter:ResultChoiceType	1	1

< choice_question_test_action >

Substitution Group: inter:question_test_action

A ChoiceQuestion_testAction element holds information about the ChoiceQuestion to test for and what to do when it has been answered.

Child Elements	Type	MinOccurs	MaxOccurs
inter:when_choice	[extends] inter:ResultChoiceType	1	unbounded

< numeric_question_test_action >

Substitution Group: inter:question_test_action

A NumericQuestion_testAction element holds information about the NumericQuestion to test for and what to do when it has been answered.

Child Elements	Type	MinOccurs	MaxOccurs
inter:when_equals	[extends] inter:ResultChoiceType	0	unbounded
inter:when_range	[extends] inter:ResultChoiceType	0	unbounded

< string_question_test_action >

Substitution Group: inter:question_test_action

A StringQuestion_testAction element holds information about the StringQuestion to test for and what to do when it has been answered.

Child Elements	Type	MinOccurs	MaxOccurs
when_pattern	n/a	1	unbounded

< results >

The results element holds information about question, questionnaire, and test action results.

Attributes:

- start_time   xsd:dateTime   (optional)
- end_time   xsd:dateTime   (optional)

Child Elements	Type	MinOccurs	MaxOccurs
title	inter:TextType	0	1
target	xsd:string	0	unbounded
target_address	xsd:string	0	unbounded
questionnaire_result	n/a	0	unbounded
inter:question_result	inter:QuestionResultType	0	unbounded
test_action_result	n/a	0	unbounded

< question_result >

Type: inter:QuestionResultType

A QuestionResult element contains information about the question associated with a particular result.

< boolean_question_result >

Substitution Group: inter:question_result

A BooleanQuestionResult element contains information about the BooleanQuestion, its answer, and the associated result.

Child Elements	Type	MinOccurs	MaxOccurs
answer	xsd:boolean	1	1

< choice_question_result >

Substitution Group: inter:question_result

A ChoiceQuestionResult element contains information about the ChoiceQuestion, its answer (the id), and the associated result.

Child Elements	Type	MinOccurs	MaxOccurs
answer	n/a	1	1

< numeric_question_result >

Substitution Group: inter:question_result

A NumericQuestionResult element contains information about the NumericQuestion, its answer, and the associated result.

Child Elements	Type	MinOccurs	MaxOccurs
answer	xsd:decimal	1	1

< string_question_result >

Substitution Group: inter:question_result

A StringQuestionResult element contains information about the StringQuestion, its answer, and the associated result.

Child Elements	Type	MinOccurs	MaxOccurs
answer	xsd:string	1	1

== CompoundTestActionType ==

The compoundTestActionType complex type defines an element used to hold information about Questions to test for, the Actions to take, and how to operate on them to produce a result.

== DescriptionType ==

The DescriptionType complex type defines an element that holds any information.

Attributes:
-     n/a

Child Elements	Type	MinOccurs	MaxOccurs

== GeneratorType ==

The generatorType complex type defines an element that is used to hold information about when a particular Interactive document was generated, what version of the schema was used, what tool was used to generate the document, and what version of the tool was used.

Additional generator information is also allowed although it is not part of the official Interactive Schema. Individual organizations can place generator information that they feel are important and these will be skipped during the validation.

Child Elements	Type	MinOccurs	MaxOccurs
product_name	xsd:string	0	1
product_version	xsd:string	0	1
schema_version	xsd:decimal	1	1
timestamp	xsd:dateTime	1	1

== ItemBaseType ==

The itemBaseType complex type defines elements that have a unique identifier, and a set of notes.

Child Elements	Type	MinOccurs	MaxOccurs
notes	xsd:string	0	unbounded

== OperationType ==

The operationType complex type defines an element that holds information about what set of testActions to perform and how to aggregate the results.

Attributes:

- operation   n/a
- negate   xsd:boolean
- priority   inter:PriorityType   (optional -- default='LOW')

Child Elements	Type	MinOccurs	MaxOccurs
inter:test_action_ref	inter:TestActionRefValuePattern	1	unbounded

== PatternType ==

The pattern element specifies the acceptable combination and ordering of characters in regular expression form.

Attributes:

Simple Content	xsd:string

-- PriorityType --

Value	Description
HIGH	This indicates that an item must be given the most priority over others.
MEDIUM	This indicates that an item must be given more priority than LOW but less than HIGH priority items.
LOW	This indicates that an item must be given the least priority over otners.

== QuestionTestActionType ==

The questionItemBaseType complex type defines an element that is used to hold information about the question and a possible answer.

== QuestionResultType ==

The questionResultType complext type defines an element that holds information about a question and its associated result.

Attributes:

- question_ref   inter:QuestionIDPattern   (required)
- result   inter:ResultType   (required)

== QuestionType ==

The questionType complex type defines an element that is used to hold information about a question and any instructions to help in determining an answer.

== RangeType ==

A RangeType complexType is a 2-tuple containing information about a numeric minimum and maximum.

Child Elements	Type	MinOccurs	MaxOccurs
min	n/a	0	1
max	n/a	0	1

== ResultChoiceType ==

The resultChoiceType complex type defines an element that is used to hold information about what to do when an answer was given - either produce a result or move on to another test.

Child Elements	Type	MinOccurs	MaxOccurs
result	inter:ResultType	1	1
inter:test_action_ref	inter:TestActionRefValuePattern	1	1

-- ResultType --

The resultType simple type defines acceptable result indicators.

Value	Description
PASS	A PASS value indicates that the check passed its test.
FAIL	A FAIL value indicates that the check did not pass its test.
UNKNOWN	An UNKNOWN value indicates that the result of a test cannot be determined.
ERROR	An ERROR value indicates that an error occured while processing the check. If no match is found, then ERROR should be reported and not UNKNOWN.
NOT_TESTED	A NOT_TESTED value indicates that the check has not been

	tested yet.
NOT_APPLICABLE	A NOT_APPLICABLE value indicates that the check is not relevant and can be skipped.

Below are tables describing the result of an evaluation.

```
                 || num of individual results    ||
   operator      ||                               || final result is
                 || P  | F  | E  | U  | NT | NA ||
-----------------||------------------------------||---------------------
                 || 1+ | 0  | 0  | 0  | 0  | 0+ || Pass (P)
                 || 0+ | 0+ | 0+ | 0+ | 0+ | 0+ || Fail (F)
      AND        || 0+ | 0  | 1+ | 0+ | 0+ | 0+ || Error (E)
                 || 0+ | 0  | 0  | 1+ | 0+ | 0+ || Unknown (U)
                 || 0+ | 0  | 0  | 0  | 1+ | 0+ || Not Tested (NT)
                 || 0  | 0  | 0  | 0  | 0  | 1+ || Not Applicable (NA)
-----------------||------------------------------||---------------------
                 || 1+ | 0+ | 0+ | 0+ | 0+ | 0+ || Pass (P)
                 || 0  | 0+ | 0  | 0  | 0  | 0+ || Fail (F)
      OR         || 0  | 0+ | 1+ | 0+ | 0+ | 0+ || Error (E)
                 || 0  | 0+ | 0  | 1+ | 0+ | 0+ || Unknown (U)
                 || 0  | 0+ | 0  | 0  | 1+ | 0+ || Not Tested (NT)
                 || 0  | 0  | 0  | 0  | 0  | 1+ || Not Applicable (NA)
```

TextType ==

The TextType complex type defines an element that holds any information.

-- QuestionnaireIDPattern --

inter:[A-Za-z0-9_\-\.]+:questionnaire:[1-9][0-9]*

-- QuestionIDPattern --

inter:[A-Za-z0-9_\-\.]+:question:[1-9][0-9]*

-- QuestionTestActionIDPattern --

inter:[A-Za-z0-9_\-\.]+:testaction:[1-9][0-9]*

-- TestActionRefValuePattern --

inter:[A-Za-z0-9_\-\.]+:testaction:[1-9][0-9]* inter:[A-Za-z0-9_\-\.]+:questionnaire:[1-9][0-9]*

-- ChoiceIDPattern --

inter:[A-Za-z0-9_\-\.]+:choice:[1-9][0-9]*

< test_action_ref >

The testAction_ref element holds a reference (id) of a TestAction.

< when_choice >

The element when_choice specifies the Action to take when a particular choice is determined to be the answer.

Attributes:

- choice_ref   inter:ChoiceIDPattern

< choice >

A choice element holds information about one acceptable answer to the question.

< when_equals >

A when_equals element holds information about what to do when an exact match is encountered.

Child Elements	Type	MinOccurs	MaxOccurs
value	xsd:decimal	1	unbounded

< when_range >

A when_range element holds information about what to do when a match within a range is encountered.

Child Elements	Type	MinOccurs	MaxOccurs
range	inter:RangeType	1	unbounded

== ReferenceType ==

The referenceType complex type defines an element that is used to hold information about an external reference given its URI and description.

== StepType ==

The stepType complex type defines an element that is used to hold information about one particular step to do and any external references.

Attributes:

- is_done   xsd:boolean
- is_required   xsd:boolean

Child Elements	Type	MinOccurs	MaxOccurs
description	inter:TextType	0	1
reference	inter:ReferenceType	0	unbounded
inter:step	inter:StepType	0	unbounded

< step >

Type: inter:StepType

The step element contains information about something to do.

< instructions >

The instructions element contains information about a step by step procedure to guide the user in answering a question.

Child Elements	Type	MinOccurs	MaxOccurs
title	inter:TextType	1	1
inter:step	inter:StepType	1	unbounded