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Information technology — Remote Operations: Concepts, model and notation

AMENDMENT 1: Built-in operations

*Technologies de l'information — Opérations à distance: Concepts, modèle
et notation*

AMENDEMENT 1: Opérations intégrées



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Contents

	<i>Page</i>
1) Subclause 3.3.....	1
2) Subclause 8.2.1.....	1
3) Subclause 8.2.....	2
4) Subclause 10.1.....	2
5) Subclause 10.5.1.....	2
6) Subclause 10.5.2.....	2
7) Subclauses 10.6 through 10.16.....	2
8) Subclauses 10.6 through 10.11.....	2
10) Annex A.....	4
10) Annex D.....	6

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Foreword

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In the field of information technology, ISO and IEC have established a joint technical committee, ISO/IEC JTC 1. Draft International Standards adopted by the joint technical committee are circulated to national bodies for voting. Publication as an International Standard requires approval by at least 75 % of the national bodies casting a vote.

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Introduction

This amendment to Rec. X.880 | ISO/IEC 13712-1 provides the definition of three built-in operations – Probe, Acknowledge and Cancel – which are of general utility to designers of ROSE-based applications.

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INTERNATIONAL STANDARD

ITU-T RECOMMENDATION

INFORMATION TECHNOLOGY – REMOTE OPERATIONS:
CONCEPTS, MODEL AND NOTATIONAMENDMENT 1
Built-in operations

1) Subclause 3.3

Add the following new definition immediately after 3.3.7:

“3.3.8 idempotent: A characteristic of an operation that it can be invoked repeatedly without changing the state of the performer.”

The definitions which follow definition 3.3.8, should be renumbered accordingly.

2) Subclause 8.2.1

Add the following field underlined to the OPERATION information object class:

```

OPERATION ::= CLASS
{
    &ArgumentType          OPTIONAL,
    &argumentTypeOptional  BOOLEAN OPTIONAL,
    &returnResult          BOOLEAN DEFAULT TRUE,
    &ResultType            OPTIONAL,
    &resultTypeOptional    BOOLEAN OPTIONAL,
    &Errors                ERROR OPTIONAL,
    &Linked                OPERATION OPTIONAL,
    &synchronous           BOOLEAN DEFAULT FALSE,
    &idempotent            BOOLEAN DEFAULT FALSE,
    &alwaysReturns         BOOLEAN DEFAULT TRUE,
    &InvokePriority        Priority OPTIONAL,
    &ResultPriority        Priority OPTIONAL,
    &operationCode         Code UNIQUE OPTIONAL
}
WITH SYNTAX
{
    [ARGUMENT          &ArgumentType [OPTIONAL      &argumentTypeOptional]]
    [RETURN RESULT    &returnResult]
    [RESULT           &ResultType [OPTIONAL      &resultTypeOptional]]
    [ERRORS          &Errors]
    [LINKED          &Linked]
    [SYNCHRONOUS     &synchronous]
    [IDEMPOTENT       &idempotent]
    [ALWAYS RESPONDS &alwaysReturns]
    [INVOKE PRIORITY &InvokePriority]
    [RESULT-PRIORITY &ResultPriority]
    [CODE            &operationCode]
}

```

3) Subclause 8.2

Add a new subclause as follows:

“8.2.14 The `&idempotent` field specifies whether or not the operation is idempotent, taking the value `TRUE` if it is, and `FALSE` otherwise.”

4) Subclause 10.1

Rewrite item a) as follows (with the new text underlined):

“a) generally useful operations, (`emptyBind`, `emptyUnbind`, `no-op`, `probe`, `acknowledge`, `cancel`), and their associated errors;”

5) Subclause 10.5.1

Rewrite the `no-op OPERATION` definition by adding an additional field (underlined) as follows:

```
no-op OPERATION ::=
{
    IDEMPOTENT          TRUE
    ALWAYS RESPONDS     FALSE
    CODE                 local:-1
}
```

6) Subclause 10.5.2

Rewrite 10.5.2 as follows (with the new text underlined):

“10.5.2 The operation is idempotent and does not return.”

7) Subclauses 10.6 through 10.16

Renumber 10.6 through 10.16 as 10.12 through 10.22 respectively.

8) Subclauses 10.6 through 10.11

Add the following new subclauses numbered 10.6 through 10.11:

10.6 Probe

10.6.1 The `probe` operation enquires about the outcome of a previously invoked operation. It is specified as follows:

```
probe OPERATION ::=
{
    ARGUMENT    SEQUENCE
    {
        invokeId  [0] InvokeId
    }
    RESULT      ENUMERATED{running(0), finished(1), unknown(2), ...}
    IDEMPOTENT  TRUE
    CODE        local:-2
}
```

10.6.2 There is a single argument, of type `InvokeId`, which identifies the invoked operation being enquired about.

10.6.3 The request always returns a result, which indicates whether the operation invocation is still running, its performance is finished, or that it is unknown.

NOTE – An invocation may be unknown because it never happened, or because it has been forgotten by the performer.

10.6.4 The operation is idempotent.

10.6.5 A probe (with a result of finished) causes, as a side effect, the retransmission of any return from the invocation concerned, except if the operation was idempotent.

NOTE – This implies that the performer of a non-idempotent operation has to retain the response (result or error) if the probe operation has been included in the operation package.

10.7 Acknowledge

10.7.1 The acknowledge operation acknowledges receipt of the return of some (non-idempotent) operation invocation. It is specified as follows:

```

acknowledge OPERATION ::=
{
    ARGUMENT    InvokeId
    RESULT      ENUMERATED{acknowledged(0), unknown(1), ...}
    IDEMPOTENT  TRUE
    CODE        local:-3
}

```

10.7.2 There is a single argument, of type InvokeId, which identifies the invocation whose return is being acknowledged.

10.7.3 The request always returns a result, which indicates either that the return is now considered acknowledged, or that the operation invocation concerned is unknown.

NOTE – An invocation may be unknown because it never happened, or because it has been forgotten by the performer.

10.7.4 The operation is idempotent.

10.7.5 This operation must be included in every operation package which includes the probe operation.

10.8 Probe and Acknowledge

10.8.1 The ProbeAndAcknowledge operation set comprises the two operations suggested by its name, and will frequently both be needed in a package. It is specified as follows:

```

ProbeAndAcknowledge OPERATION ::= {probe | acknowledge}

```

10.9 Cancel

10.9.1 The cancel operation requests the premature termination of the performance of an operation. Only operations which include the cancelled error (see 10.11) in their &Errors field can be cancelled. It is specified as follows:

```

cancel OPERATION ::=
{
    ARGUMENT    InvokeId
    ERRORS      {cancelFailed}
    IDEMPOTENT  TRUE
    CODE        local:-4
}

```

10.9.2 There is a single argument, of type `InvokeId`, which identifies the invoked operation being cancelled.

10.9.3 Should the request fail, a `cancelFailed` error (see 10.10) will be returned.

10.9.4 The operation is idempotent.

10.10 Cancel failed

10.10.1 A `cancelFailed` error reports a problem in performing a `cancel`. It is specified as follows:

```
cancelFailed ERROR ::=
{
    PARAMETER          SET
    {
        problem        [0] CancelProblem,
        operation       [1] InvokeId
    }
    CODE               local:-2
}

CancelProblem ::= ENUMERATED
{unknownOperation(0), tooLate(1), operationNotCancellable(2), ...}
```

10.10.2 The various parameters have the meaning as defined in 10.10.2.1 and 10.10.2.2.

10.10.2.1 The particular problem encountered with cancellation is indicated from the following possibilities:

- a) `unknownOperation` – This operation invocation has either not happened, or has been forgotten.
- b) `tooLate` – The operation has already been performed, or the execution is at a stage that does not permit a cancellation.
- c) `operationNotCancellable` – The operation that was invoked was not one of those able to be cancelled.

10.10.2.2 The identification of the operation (invocation) which was to be cancelled.

10.11 Cancelled

The `cancelled` error is reported if some operation is cancelled. The error must be included in the `&Errors` field of the affected operation. It is specified as follows:

```
cancelled ERROR ::= {CODE local:-3}
```

9) Annex A

Change the first module reference as follows (with the change underlined):

Remote-Operations-Information-Objects {joint-iso-itu-t remote-operations(4) informationObjects(5) version2(1)}

Add the following field (underlined) to the OPERATION information object class:

OPERATION ::= CLASS		
{		
&ArgumentType	OPTIONAL,	
&argumentTypeOptional	BOOLEAN OPTIONAL,	
&returnResult	BOOLEAN DEFAULT TRUE,	
&ResultType	OPTIONAL,	
&resultTypeOptional	BOOLEAN OPTIONAL,	
&Errors	ERROR OPTIONAL,	
&Linked	OPERATION OPTIONAL,	
&synchronous	BOOLEAN DEFAULT FALSE,	
<u>&idempotent</u>	<u>BOOLEAN DEFAULT FALSE,</u>	
&alwaysReturns	BOOLEAN DEFAULT TRUE,	
&InvokePriority	Priority OPTIONAL,	
&ResultPriority	Priority OPTIONAL,	
&operationCode	Code UNIQUE OPTIONAL	
}		
WITH SYNTAX		
{		
[ARGUMENT	&ArgumentType [OPTIONAL	&argumentTypeOptional]]
[RETURN RESULT	&returnResult]	
[RESULT	&ResultType [OPTIONAL	&resultTypeOptional]]
[ERRORS	&Errors]	
[LINKED	&Linked]	
[SYNCHRONOUS	&synchronous]	
<u>[IDEMPOTENT</u>	<u>&idempotent]</u>	
[ALWAYS RESPONDS	&alwaysReturns]	
[INVOKE PRIORITY	&InvokePriority]	
[RESULT-PRIORITY	&ResultPriority]	
[CODE	&operationCode]	
}		

Change the third module reference as follows (with the change underlined):

Remote-Operations-Useful-Definitions {joint-iso-itu-t remote-operations(4) useful-definitions(7) version2(1)}

Change the no-op OPERATION definition by adding an additional field (underlined) as follows:

no-op OPERATION ::=		
{		
<u>IDEMPOTENT</u>	<u>TRUE</u>	
ALWAYS RESPONDS	FALSE	
CODE	local:-1	
}		