INTERNATIONAL STANDARD

ISO/IEC 15505

Third edition
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Information technology — Telecommunications and information exchange between systems — Private Integrated Services Network — Specification, functional model and information flows — Message Waiting Indication supplementary service

Technologies de l'information — Télécommunications et échange d'information entre systèmes — Réseau privé à intégration de services — Spécifications, modèle fonctionnel et flux d'informations — Service supplémentaire d'indication d'attente de message

Reference number
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Foreword

ISO (the International Organization for Standardization) and IEC (the International Electrotechnical Commission) form the specialized system for worldwide standardization. National bodies that are members of ISO or IEC participate in the development of International Standards through technical committees established by the respective organization to deal with particular fields of technical activity. ISO and IEC technical committees collaborate in fields of mutual interest. Other international organizations, governmental and non-governmental, in liaison with ISO and IEC, also take part in the work. In the field of information technology, ISO and IEC have established a joint technical committee, ISO/IEC JTC 1.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 2.

The main task of the joint technical committee is to prepare International Standards. 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.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO and IEC shall not be held responsible for identifying any or all such patent rights.

ISO/IEC 15505 was prepared by ECMA (as ECMA-241) and was adopted, under a special “fast-track procedure”, by Joint Technical Committee ISO/IEC JTC 1, *Information technology*, in parallel with its approval by national bodies of ISO and IEC.

This third edition cancels and replaces the first edition (ISO/IEC 15505:2000), which has been technically revised.

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Introduction

This International Standard is one of a series of Standards defining services and signalling protocols applicable to Private Integrated Services Networks (PISNs). The series uses ISDN concepts as developed by ITU-T and conforms to the framework of International Standards for Open Systems Interconnection as defined by ISO/IEC.

This International Standard specifies the Message Waiting Indication supplementary service.

This International Standard is based upon the practical experience of ECMA member companies and the results of their active and continuous participation in the work of ISO/IEC JTC 1, ITU-T, ETSI and other international and national standardization bodies. It represents a pragmatic and widely based consensus.

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Information technology — Telecommunications and information exchange between systems — Private Integrated Services Network — Specification, functional model and information flows — Message Waiting Indication supplementary service

1 Scope

This International Standard specifies supplementary service Message Waiting Indication (SS-MWI), which is related, but not limited, to various basic services supported by Private Integrated Services Networks (PISNs). Basic services are specified in ISO/IEC 11574.

This supplementary service MWI enables a Served User to be sent a Message Waiting Indication and also enables this Message Waiting Indication to be cancelled.

Service specifications are produced in three stages, according to the method described in ETS 300 387. This International Standard contains the stage 1 and stage 2 specifications of SS-MWI. The stage 1 specification (clause 6) specifies the supplementary service as seen by users of PISNs. The stage 2 specification (clause 7) specifies the functional entities involved in the supplementary service and the information flows between them.

2 Conformance

In order to conform to this International Standard, a stage 3 standard shall specify signalling protocols and equipment behaviour that are capable of being used in a PISN which supports the supplementary service specified in this International Standard. This means that, to claim conformance, a stage 3 standard is required to be adequate for the support of those aspects of clause 6 (stage 1) and clause 7 (stage 2) which are relevant to the interface or equipment to which the stage 3 standard applies.

3 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.

ISO/IEC 11574:2000, *Information technology - Telecommunications and information exchange between systems - Private Integrated Services Network - Circuit-mode 64 kbit/s bearer services - Service description, functional capabilities and information flows*

ISO/IEC 11579-1:1994, *Information technology - Telecommunications and information exchange between systems - Private integrated services network - Part 1: Reference configuration for PISN Exchanges (PINX)*

ETS 300 387:1994, *Private Telecommunication Network (PTN); Method for the specification of basic and supplementary services*

ITU-T Rec. I.112:1993, *Vocabulary of terms for ISDNs*

ITU-T Rec. I.210:1993, *Principles of telecommunication services supported by an ISDN and the means to describe them*

ITU-T Rec. Z.100:1999, *Specification and description language (SDL)*

4 Terms and definitions

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

4.1 External definitions

This International Standard uses the following terms defined in other documents:

- Basic Service (ITU-T Rec. I.210)
- Private Integrated services Network eXchange (PINX) (ISO/IEC 11579-1)
- Private Integrated Services Network (PISN) (ISO/IEC 11579-1)

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– Service (ITU-T Rec. I.112)

– Signalling (ITU-T Rec. I.112)

– Supplementary Service (ITU-T Rec. I.210)

– User (ISO/IEC 11574)

4.2 Other definitions

4.2.1 Served User

The user to whom the Message Waiting Indication is sent on initiative of the Message Centre.

4.2.2 Message Centre

The entity which activates or deactivates the Message Waiting Indication as a result of the storage or retrieval of messages.

4.2.3 Message Waiting Indication

An indication to the Served User when messages are waiting for the Served User.

NOTE - The indication may be a lamp, special tone, display etc. This is outside the scope of this International Standard.

5 List of acronyms

ANF	Additional Network Feature
FE	Functional Entity
ISDN	Integrated Services Digital Network
MWI	Message Waiting Indication
PINX	Private Integrated services Network eXchange
PISN	Private Integrated Services Network
SDL	Specification and Description Language
SS	Supplementary Service

6 SS-MWI stage 1 specification

6.1 Description

6.1.1 General description

The supplementary service MWI enables a Served User to be sent a Message Waiting Indication and also enables this Message Waiting Indication to be cancelled.

NOTE - The Message Waiting Indication is sent on activation by the Message Centre.

NOTE - The Message Waiting Indication is cancelled on deactivation by the Message Centre.

A Served User can receive separate MWIs for each of the services for which there is a message waiting.

NOTE - A service for which there is a message waiting would normally use the related basic service to retrieve that message.

6.1.2 Qualifications on applicability to telecommunication services

This supplementary service does not apply directly to any basic telecommunication service. However, a MWI relates to a basic service for which there are messages waiting.

6.2 Procedures

6.2.1 Provision / withdrawal

SS-MWI may be provided or withdrawn after pre-arrangement with the service provider or may be generally available to all users.

6.2.2 Normal procedures

6.2.2.1 Activation, deactivation and interrogation

The PISN shall provide activation / deactivation by the Message Centre. In addition, the PISN may provide interrogation by the Served User.

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To activate SS-MWI, the Message Centre shall supply the PISN number and the service for which there is a message waiting and may, as an implementation option, add any combination of the following pieces of information: the identity of the Message Centre; the number of messages waiting for the Served User for that service; the address of the user that left a message; the time when a message was left; the priority of the highest priority message waiting for that service. After activation, SS-MWI may be activated again whenever the number of waiting messages changes.

To deactivate SS-MWI, the Message Centre shall supply the PISN number and the service for which there is no longer a message waiting.

As a result of activation, a MWI shall be sent to the Served User. The MWI may include information on messages waiting, if provided by the Message Centre. As a result of deactivation, the MWI at the Served User, for the service concerned, shall be cancelled.

When the Message Centre activates or deactivates SS-MWI at the Served User, it shall be provided with an indication of acceptance.

When the Served User interrogates SS-MWI for a particular service, the Message Centre shall provide the Served User with an indication of whether SS-MWI is activated for that service and may add, as an implementation option, any of the following information:

- the identity of the Message Centre;
- the number of messages waiting;
- the address of the user that left a message;
- the time when a message was left;
- the priority of the highest priority message waiting.

When the Served User interrogates SS-MWI for all services, the Message Centre shall provide the Served User with a list of services for which SS-MWI is active and, as an implementation option, for each service, any of the additional information listed above.

6.2.2.2 Invocation and operation

Not applicable.

6.2.3 Exceptional procedures

6.2.3.1 Activation, deactivation and interrogation

If the Served User cannot accept activation or deactivation, then the Message Centre shall be informed and may also be given the reason. If the PISN cannot accept interrogation, then the Served User shall be informed and may also be given a reason.

6.2.3.2 Invocation and operation

None.

6.3 Interactions with other Supplementary Services / Additional Network Features

Interactions with other supplementary services and ANFs for which PISN standards were available at the time of publication of this International Standard are specified below.

6.3.1 Advice of Charge (AOC)

No interaction.

6.3.2 Call Deflection (CD)

No interaction.

6.3.3 Call Forwarding Unconditional (CFU)

No interaction.

6.3.4 Call Forwarding Busy (CFB)

No interaction.

6.3.5 Call Forwarding No Reply (CFNR)

No interaction.

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6.3.6 Call Interception (CINT)

No interaction.

6.3.7 Call Intrusion (CI)

No interaction.

6.3.8 Call Offer (CO)

No interaction.

6.3.9 Call Transfer (CT)

No interaction.

6.3.10 Calling/Connected Line Identification Restriction (CLIR)

No interaction.

6.3.11 Calling/Connected Name Identification Restriction (CNIR)

No interaction.

6.3.12 Calling Line Identification Presentation (CLIP)

No interaction.

6.3.13 Calling Name Identification Presentation (CNIP)

No interaction.

6.3.14 Connected Line Identification Presentation (COLP)

No interaction.

6.3.15 Connected Name Identification Presentation (CONP)

No interaction.

6.3.16 Completion of Calls to Busy Subscribers (CCBS)

No interaction.

6.3.17 Completion of Calls on No Reply (CCNR)

No interaction.

6.3.18 Do Not Disturb (DND)

No interaction.

6.3.19 Do Not Disturb Override (DNDO)

No interaction.

6.3.20 Path Replacement (PR)

No interaction.

6.3.21 Recall (RE)

No interaction.

6.3.22 Route Restriction Class (RRC)

No interaction.

6.3.23 Wireless Terminal Location Registration (WTLR)

No interaction.

NOTE - A MWI may be directed to the new location.

6.3.24 Wireless Terminal Mobility Incoming Call (WTMI)

No interaction.

6.3.25 Wireless Terminal Mobility Outgoing Call (WTMO)

No interaction.

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6.3.26 Authentication of a WTM user (WTAT)

No interaction.

6.3.27 Authentication of the PISN (WTAN)

No interaction.

6.4 Interworking considerations

A PISN may be able to accept MWIs from a Message Centre in another network. In this case, the PISN may also be able to interrogate that Message Centre.

A PISN may be able to send MWIs to a Served User in another network. In this case, the PISN may also be able to accept interrogation requests from that Served User.

6.5 Overall SDL

Figure 1 contains the dynamic description of SS-MWI using the Specification and Description Language (SDL) defined in ITU-T Rec. Z.100 (1999). The SDL process represents the behaviour of the network in providing SS-MWI.

Input signals from the left and output signals to the left represent primitives from and to the Message Centre.

Input signals from the right and output signals to the right represent primitives from and to the Served User.

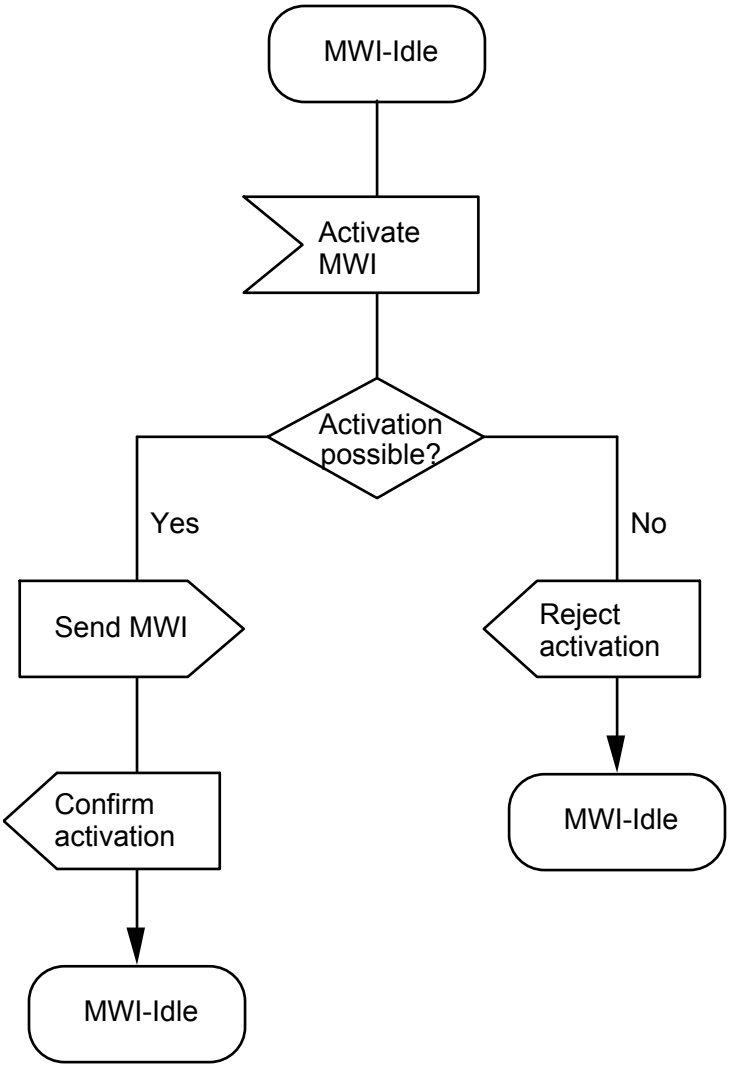


Figure 1 (part 1) - SS-MWI Overall SDL

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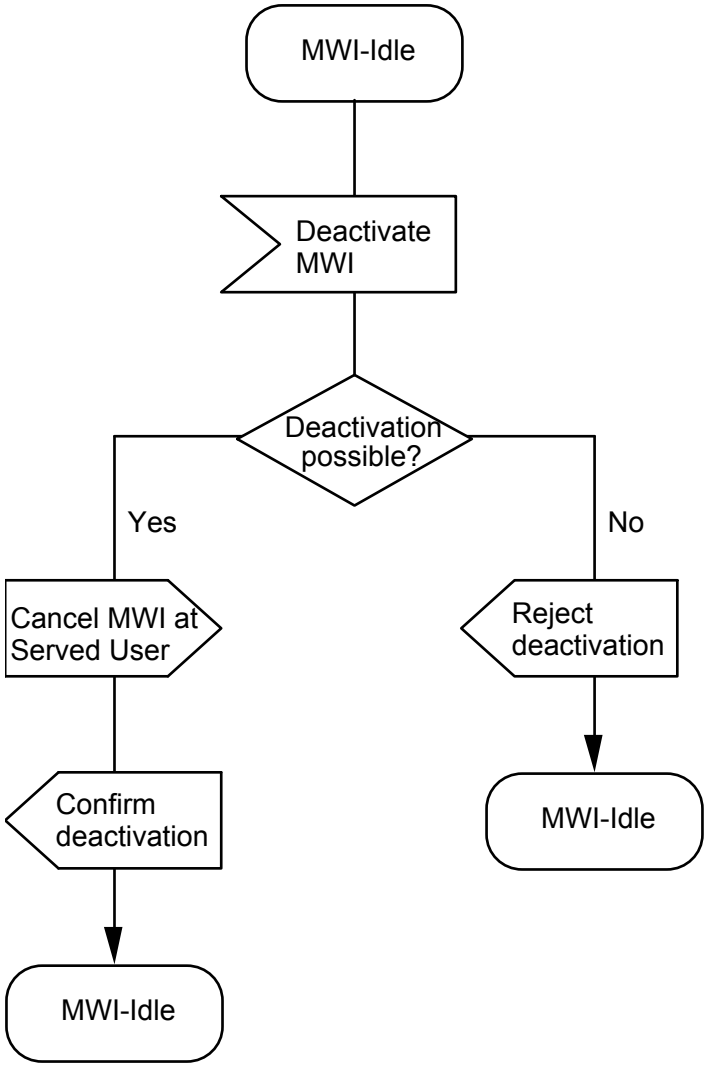


Figure 1 (part 2) - SS-MWI Overall SDL

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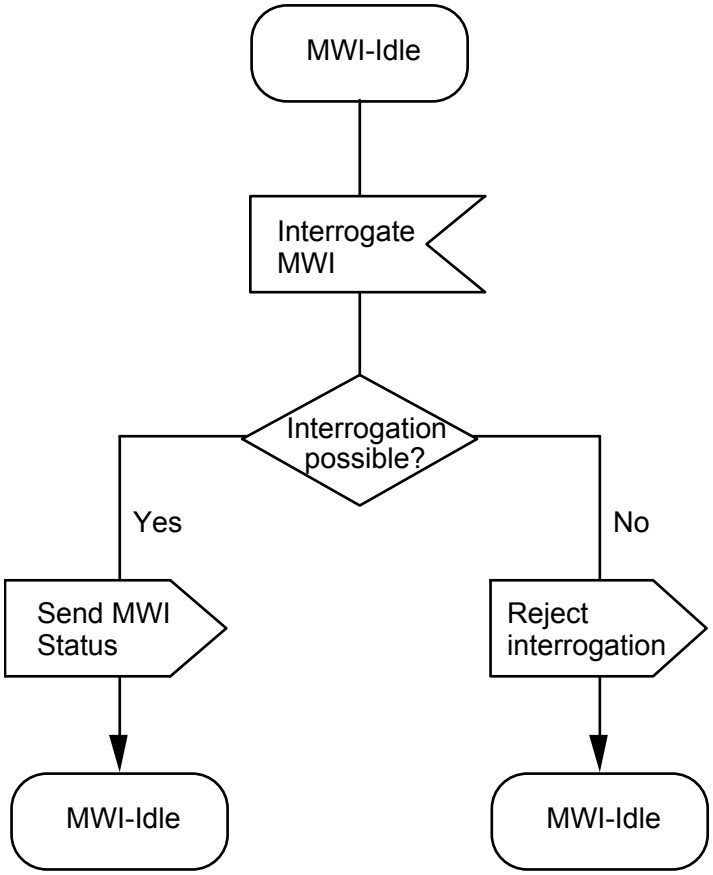


Figure 1 (part 3) - SS-MWI Overall SDL

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7 SS-MWI stage 2 specification

7.1 Functional model

7.1.1 Functional model description

The functional model shall comprise the following Functional Entities (FEs):

FE1 Message Centre's control entity;

FE2 Served User's control entity.

The following relationship shall exist between these FEs:

ra between FE1 and FE2.

Figure 2 shows these FEs and this relationship.

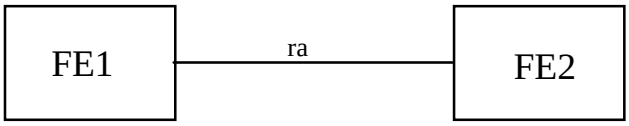


Figure 2 - Functional model for SS-MWI

7.1.2 Description of Functional Entities

7.1.2.1 Message Centre control entity, FE1

This Functional Entity:

- sends an activation / deactivation request to FE2 on initiative of the Message Centre;
- receives the result of the activation / deactivation request from FE2 and informs the Message Centre of the result;
- receives the interrogation request from FE2;
- checks if the interrogation request is allowed to be performed;
- sends the status of the Message Waiting Indication to FE2, in the case of interrogation.

7.1.2.2 Served User's control entity, FE2

This Functional Entity:

- receives the activation / deactivation request from FE1;
- checks if the activation / deactivation request is allowed to be performed;
- sends the result of the activation / deactivation request to FE1;
- sends the interrogation request to FE1;
- receives the status of the Message Waiting Indication from FE1, in the case of interrogation;
- sends/cancels MWIs to/at the Served User.

7.1.3 Relationship of functional model to Basic Call functional model

Not applicable.

7.2 Information flows

7.2.1 Definition of information flows

In the tables listing the elements in information flows, the column headed "Request" indicates which of these elements are mandatory (M) and which are optional (O) in a request/indication information flow, and the column headed "Confirm" (confirmed information flows only) indicates which of these elements are mandatory (M) and which are optional (O) in a response/confirmation information flow.

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7.2.1.1 ra_MWI_Activate

ra_MWI_Activate is a confirmed information flow across ra from FE1 to FE2 used to activate SS-MWI.

Table 1 lists the elements within the ra_MWI_Activate information flow.

Table 1 - Content of ra_MWI_Activate

Element	Request	Confirm	NOTE
Served User's number	M		1
Service	M		2
Number of messages	O		3
Priority	O		4
Message Centre identity	O		5
Originating number	O		6
Timestamp	O		7
Result		M	8

NOTE 1 - This is the Served User's PISN number.

NOTE 2 - This indicates a particular service.

NOTE 3 - This indicates the number (non-zero) of messages waiting for the Served User. If this field is omitted, then there is one or more than one message waiting.

NOTE 4 - This indicates the priority of the highest priority message waiting.

NOTE 5 - This identifies the Message Centre at which messages are waiting.

NOTE 6 - This indicates the PISN number of the user that left a message.

NOTE 7 - This indicates the time when a message was left.

NOTE 8 - This indicates acceptance or the reason for rejection.

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7.2.1.2 ra_MWI_Deactivate

ra_MWI_Deactivate is a confirmed information flow across ra from FE1 to FE2 used to deactivate SS-MWI.

Table 2 lists the elements within the ra_MWI_Deactivate information flow.

Table 2 - Content of ra_MWI_Deactivate

Element	Request	Confirm	NOTE
Served User's number	M		1
Service	M		2
Message Centre identity	O		3
Result		M	4

NOTE 1 - This is the Served User's PISN number.

NOTE 2 - This indicates a particular service.

NOTE 3 - This identifies the Message Centre at which messages have been retrieved. This element is mandatory if included in a previous ra_MWI_Activate information flow.

NOTE 4 - This indicates acceptance or the reason for rejection.

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7.2.1.3 ra_MWI_Interrogate

ra_MWI_Interrogate is a confirmed information flow across ra from FE2 to FE1 used to interrogate SS-MWI.

Table 3 lists the elements within the ra_MWI_Interrogate information flow.

Table 3 - Content of ra_MWI_Interrogate

Element	Request	Confirm	NOTE
Served User's number	M		1
Service	M	M	2
Number of messages		O	3
Priority		O	4
Message Centre identity	O	O	5
Originating number		O	6
Timestamp		O	7
Result		M	8

NOTE 1 - This is the Served User's PISN number.

NOTE 2 - In the request, this indicates a particular service or all services. The confirmation shall provide a list of zero or more services for which SS-MWI is activated.

NOTE 3 - This indicates the number (non-zero) of messages waiting for the Served User. If provided, and the request was for all services, it shall be repeated for each service for which SS-MWI is active.

NOTE 4 - This indicates the priority of the highest priority message waiting. If provided, and the request was for all services, it shall be repeated for each service for which SS-MWI is active.

NOTE 5 - This identifies the Message Centre interrogated.

NOTE 6 - This indicates the PISN number of the user that left a message.

NOTE 7 - This indicates the time when a message was left.

NOTE 8 - This indicates acceptance or the reason for rejection.

7.2.2 Relationship of information flows to Basic Call information flows

ra_MWI_Activate, ra_MWI_Deactivate and ra_MWI_Interrogate are sent independently of basic call information flows.

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7.2.3 Information flow sequences

A stage 3 standard for SS-MWI shall provide signalling procedures in support of the information flow sequences specified in the figures. In addition, signalling procedures should be provided to cover other sequences arising from error situations, interactions with Basic Call, interactions with other supplementary services, different topologies, etc.

Within a column representing an SS-MWI Functional Entity, the numbers refer to Functional Entity actions listed in 7.3.

7.2.3.1 Activation of SS-MWI

Figure 3 shows in generic form the information flow sequence for activation of SS-MWI.

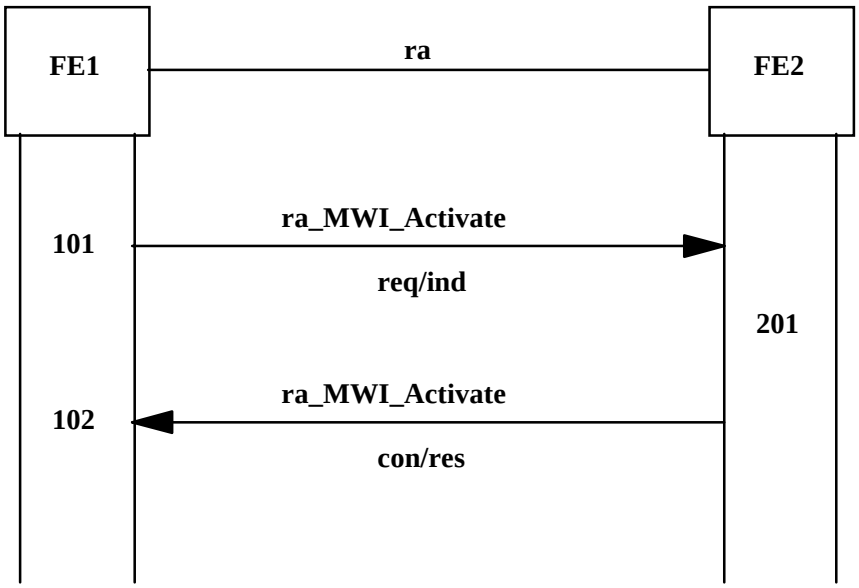


Figure 3 - Information flow sequence for activation of SS-MWI

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7.2.3.2 Deactivation of SS-MWI

Figure 4 shows in generic form the information flow sequence for deactivation of SS-MWI.

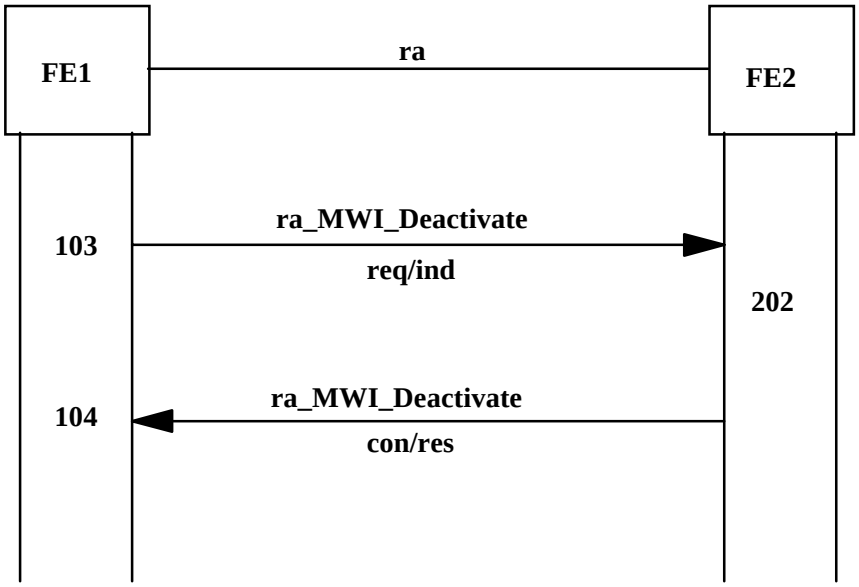


Figure 4 - Information flow sequence for deactivation of SS-MWI

7.2.3.3 Interrogation of SS-MWI

Figure 5 shows in generic form the information flow sequence for interrogation of SS-MWI.

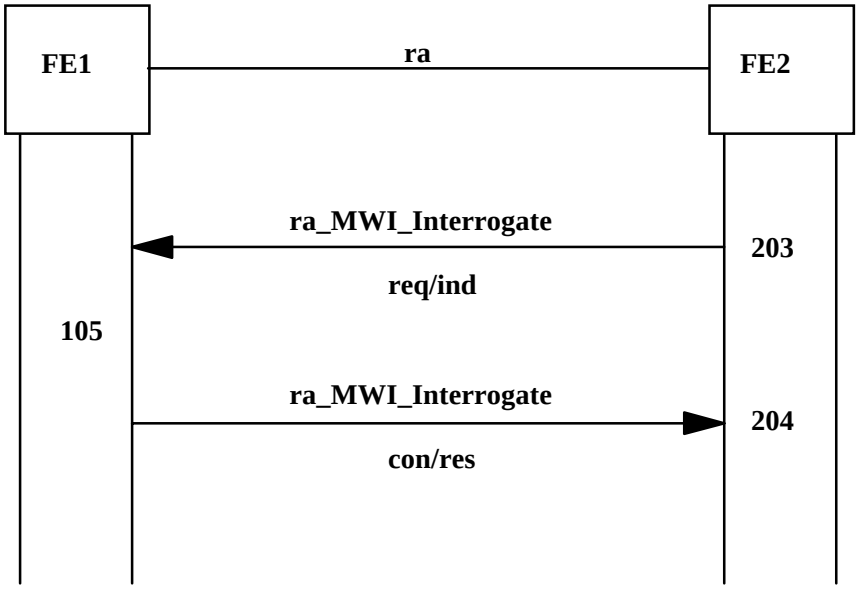


Figure 5 - Information flow sequence for interrogation of SS-MWI

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7.3 Functional Entity actions

7.3.1 Functional Entity actions of FE1

101 Send ra_MWI_Activate req/ind to FE2 in order to activate SS-MWI at the Served User.

102 Receive ra_MWI_Activate con/res from FE2.

103 Send ra_MWI_Deactivate req/ind to FE2 in order to deactivate SS-MWI at the Served User.

104 Receive ra_MWI_Deactivate con/res from FE2.

105 Process ra_MWI_Interrogate and if SS-MWI is allowed to be interrogated, obtain the current status of the Message Waiting Indication and send it back to FE2.

7.3.2 Functional Entity actions of FE2

201 Process ra_MWI_Activate and if SS-MWI is allowed to be activated at the Served User, activate SS-MWI at the Served User and send back a confirmation of the activation to FE1.

202 Process ra_MWI_Deactivate and if SS-MWI is allowed to be deactivated at the Served User, deactivate SS-MWI at the Served User and send back a confirmation of the deactivation to FE1.

203 Send ra_MWI_Interrogate req/ind to FE1 in order to interrogate SS-MWI.

204 Receive ra_MWI_Interrogate con/res from FE1.

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7.4 Functional Entity behaviour

The FE behaviours shown below are intended to illustrate typical FE behaviour in terms of information flows sent and received. The behaviour of each FE is shown using the Specification and Description Language (SDL) defined in ITU-T Rec. Z.100 (1999).

7.4.1 Behaviour of FE1

Figure 6 shows the normal behaviour of FE1. Output signals to the left and input signals from the left represent primitives to and from the Message Centre. Output signals to the right and input signals from the right represent information flows from and to FE2.

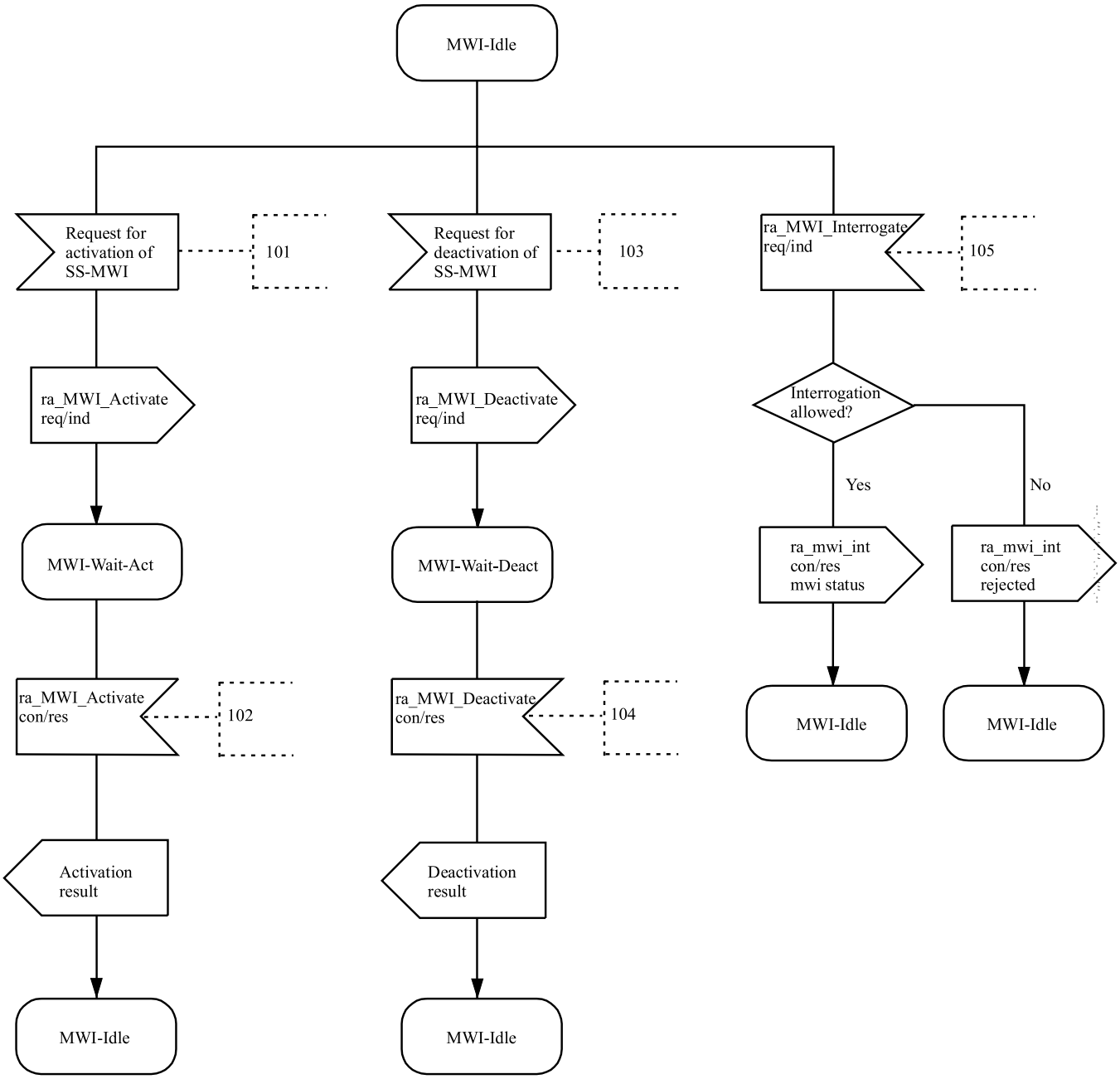


Figure 6 - SS-MWI, SDL for Functional Entity FE1

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7.4.2 Behaviour of FE2

Figure 7 shows the normal behaviour of FE2. Output signals to the left and input signals from the left represent information flows to and from the Served User. Output signals to the right and input signals from the right represent primitives to and from FE1.

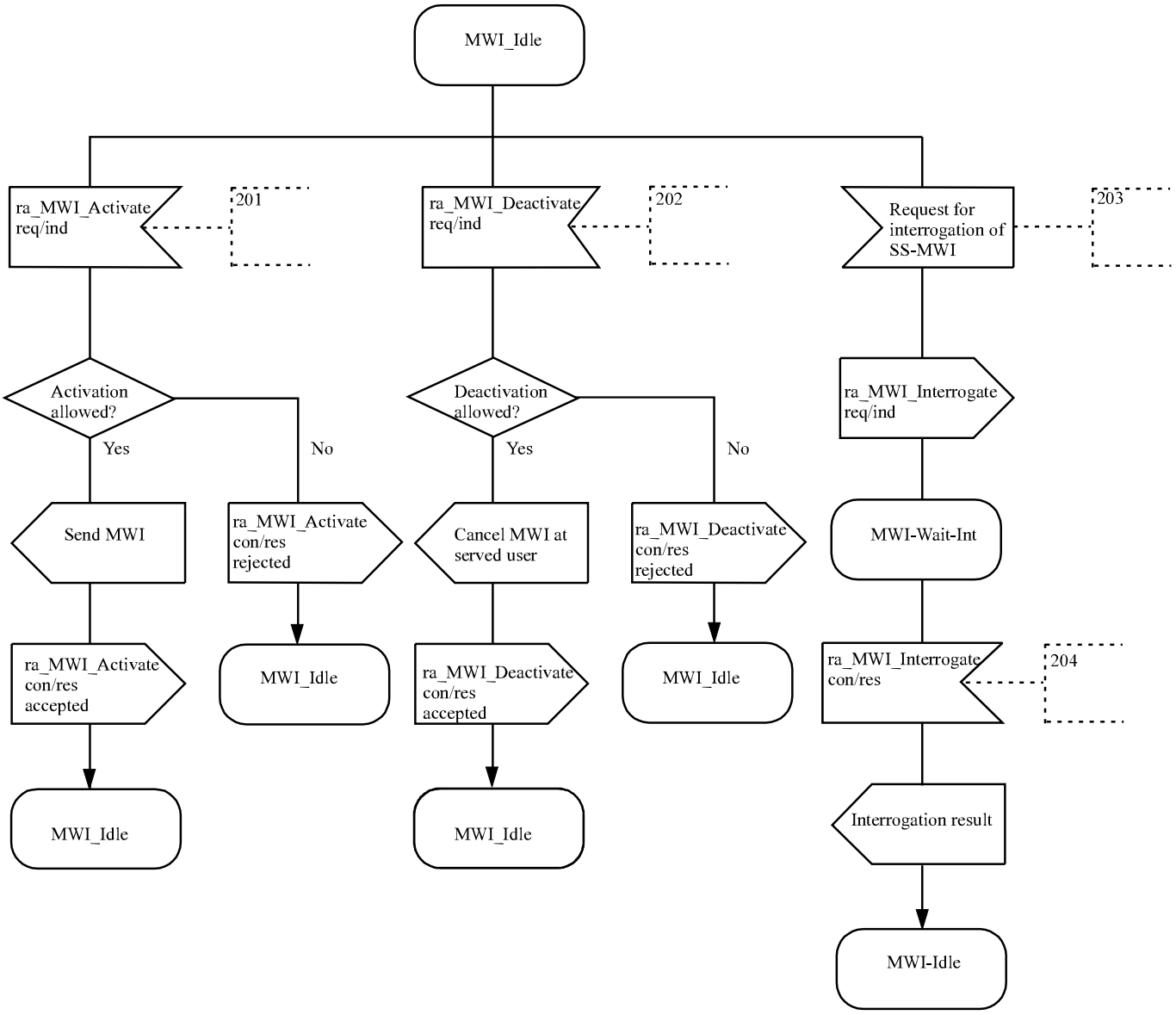


Figure 7 - SS-MWI, SDL for Functional Entity FE2

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7.5 Allocation of Functional Entities to physical equipment

The allocation of FEs to physical locations as shown in table 4 shall apply.

Table 4 - Scenarios for the allocation of FEs to physical equipment for activation / deactivation / interrogation

	FE1	**FE2**
Scenario 1	Message Centre's PINX	Served User's PINX

7.6 Interworking considerations

The allocation of FEs to physical locations in the case of interworking with other networks that support a compatible service, as shown in table 5, shall apply.

Table 5 - Scenarios for the allocation of FEs to physical equipment in the case of interworking with other networks

	FE1	**FE2**
Scenario 2	Other network	Served User's PINX
Scenario 3	Message Centre's PINX	Other network

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