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Technical Specification

Telecommunications and Internet Protocol Harmonization Over Networks (TIPHON) Release 4; Protocol Framework Definition; Part 4: Media control Service meta-protocol definition



Reference

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Foreword

This Technical Specification (TS) has been produced by ETSI Project Telecommunications and Internet Protocol Harmonization Over Networks (TIPHON).

The present document is part 4 of a multi-part deliverable. Full details of the entire series can be found in TS 101 882-1 [1].

1 Scope

The present document defines the stage 1 and stage 2 (as defined by ITU-T Recommendation I.130 [6]) requirement for the media control service required by TIPHON Release 4.

2 References

The following documents contain provisions which, through reference in this text, constitute provisions of the present document.

- References are either specific (identified by date of publication and/or edition number or version number) or non-specific.
- For a specific reference, subsequent revisions do not apply.
- For a non-specific reference, the latest version applies.

Referenced documents which are not found to be publicly available in the expected location might be found at <http://docbox.etsi.org/Reference>.

- [1] ETSI TS 101 882-1: "Telecommunications and Internet Protocol Harmonization Over Networks (TIPHON) Release 4; Protocol Framework Definition; Part 1: Meta-protocol design rules, development method, and mapping guideline".
- [2] ETSI TS 101 314: "Telecommunications and Internet Protocol Harmonization Over Networks (TIPHON) Release 4; Abstract Architecture and Reference Points Definition; Network Architecture and Reference Points".
- [3] ETSI TS 101 878: "Telecommunications and Internet Protocol Harmonization Over Networks (TIPHON) Release 4; Service Capability Definition; Service Capabilities for TIPHON Release 4".
- [4] ITU-T Recommendation Z.100 (1996): "Specification and description language (SDL) with corrigendum 1".
- [5] ITU-T Recommendation X.680: "Information technology - Abstract Syntax Notation One (ASN.1): Specification of basic notation".
- [6] ITU-T Recommendation I.130: "Method for the characterization of telecommunications services supported by an ISDN and network capabilities of an ISDN".

3 Definitions and abbreviations

3.1 Definitions

For the purposes of the present document, the definitions given in TS 101 878 [3] apply.

3.2 Abbreviations

For the purposes of the present document, the abbreviations given in TS 101 878 [3], and the following apply:

ASN.1	Abstract Syntax Notation 1
BC	Bearer Control entity
MC	Media Control
MFE	Media control Functional Entity
MSC	Message Sequence Chart
OMG	Object Management Group

QoS	Quality of Service
SDL	Specification and Description Language
UML	Unified Modelling Language

4 Media control service

4.1 Purpose

Media control allows reservation and allocation of resources and media flows for establishing of the media stream (e.g. to reserve processing capability for soft codecs or to switch into the path hard codecs).

4.2 Description

Media Control service (MC) establishes the media elements required to support a bearer. It is used to establish a QoS controlled transport capability in accordance with the QoS class identified by the call control meta-protocol.

MC does the following:

- maintains the media state;
- establishes and releases media elements;
- Establishes media flows to other media elements.

4.3 Procedures

4.3.1 Provision/withdrawal

Media control service shall be available to all Bearer Control entities in a TIPHON system.

4.3.2 Normal procedures

4.3.2.1 Activation/deactivation

Media control shall be permanently activated.

4.3.2.2 Invocation and operation

Media control shall be invoked by the following events:

- A media resource reservation request;
- A media resource allocation request; or
- A media resource capability request.

When a call Bearer Control entity (BC) makes a media reservation request the media control service reserves the resources to support the specified type of connection. A media establishment request from the BC causes the media control to assign the reserved resources (both media and transport resources).

A media release request from a BC causes the media control service to release allocated resources.

When a call Bearer Control entity (BC) makes a media resource capability request the media control service shall retrieve and return the requested resource information.

4.3.3 Exceptional procedures

4.3.3.1 Invocation and operation

If it not possible to allocate the media resource requested, the Bearer Control entity shall be informed. The Bearer Control entity may then choose to attempt with a reduced media resource request or cancel the media resource request.

If reserved media resources are not established by the Bearer Control entity, they shall be released by a reserve timer expiration.

If requested media resource capability cannot be provided, the Bearer Control entity shall be informed.

4.4 Service capabilities used in service definition

Although not explicitly identified, aspects of the following service capabilities are used in definition of the media control service:

- SetMediaEncode;
- ClearMediaEncode;
- MediaReportEncode.

The TIPHON Release 4 service capabilities are defined in TS 101 878 [3].

4.5 Overall behaviour

Figure 1 contains the dynamic description of media control signalling using a Unified Modelling Language (UML) activity diagram. The activity diagram represents the behaviour of a TIPHON system in providing media control Signalling.

NOTE: The syntax and semantics of UML diagrams are defined by the Object Management Group (OMG).

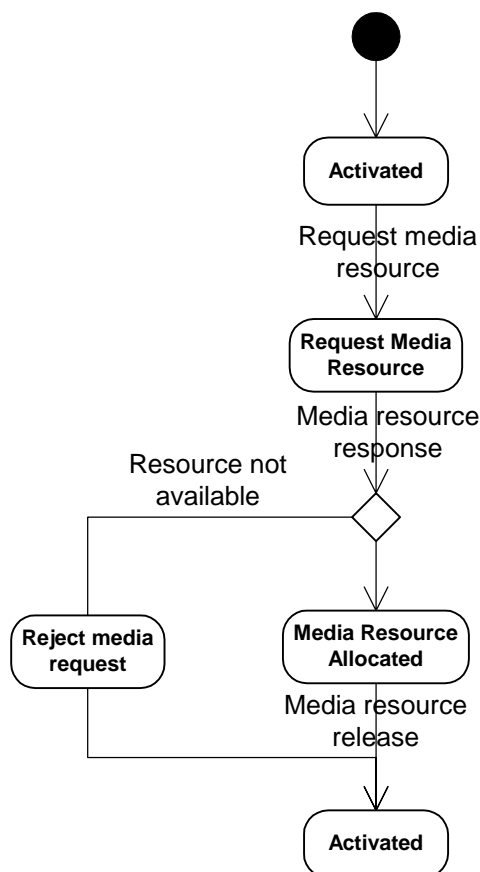


Figure 1: Overall behaviour of media control service

5 Functional entity model and information flows

5.1 Functional entity model

5.1.1 Description of model

The functional model shall comprise of the following Media control service Functional Entities (MFE):

- Bearer Control entity The application that instigates the service request;
- MFE1 A media control coordination function in the originating terminal;
- MFE2 A media control coordination function in the network functional group;
- MFE3 A media control coordination function in the terminating terminal.

The following functional relationships shall exist between these MFEs:

- ra between a Bearer Control entity and a Media control coordination function (MFE1) in the originating terminal functional group;
- rb between a Bearer Control entity and a Media control coordination function (MFE2) in the gateway functional group;
- rc between a Bearer Control entity and a Media control coordination function (MFE3) in the terminating terminal functional group;

Figure 2 shows the media control service functional entities and the relationships between them.

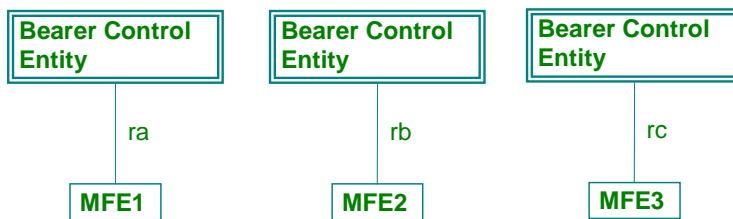


Figure 2: Media control service functional entity model

5.1.2 Description of functional entities

5.1.2.1 Bearer Control (BC) entity

The Bearer Control entity acts on behalf of the call control entity to request reservation, allocation, or release of specific media stream capabilities.

5.1.2.2 Media control coordination function in originating terminal, MFE1

The Media control coordination function in the originating terminal functional group controls reservation, allocation, and release of media encoding resources based on the local state information. On a media reservation request from the Bearer Control entity, MFE1 checks if the requested media requirement can be fulfilled and if so MFE1 attempts reservation of appropriate resources. On a media allocation request MFE1 checks if the requested media resource has been reserved and, if so, attempts allocation of the reserved resource. When receiving a media release request MFE1 releases the specified resources.

5.1.2.3 Media control coordination function in gateway functional group, MFE2

The Media control coordination function in the gateway functional group controls reservation, allocation, and release of media encoding resources based on the local state information. On a media reservation request from the Bearer Control entity, MFE2 checks if the requested media requirement can be fulfilled and if so MFE2 attempts reservation of appropriate resources. On a media allocation request MFE2 checks if the requested media resource has been reserved and, if so, attempts allocation of the reserved resource. When receiving a media release request MFE2 releases the specified resources.

5.1.2.4 Media control coordination function in terminating terminal group, MFE3

The Media control coordination function in the terminating terminal functional group controls reservation, allocation, and release of media encoding resources based on the local state information. On a media reservation request from the Bearer Control entity, MFE3 checks if the requested media requirement can be fulfilled and if so MFE3 attempts reservation of appropriate resources. On a media allocation request MFE3 checks if the requested media resource has been reserved and, if so, attempts allocation of the reserved resource. When receiving a media release request MFE3 releases the specified resources.

5.2 Information flows

5.2.1 Definition of information flows

NOTE: In the tables within this clause, the following convention is used in the "Value" columns. Un-bulleted lists of values indicate that all items in the list are included in the associated information element; bulleted lists of values indicate that only one item in the list is included in the information element.

5.2.1.1 Relationship ra

5.2.1.1.1 OT_MediaReservation

OT_MediaReservation is a confirmed information flow that shall be sent across relationship ra from the Bearer Control entity to MFE1 to reserve specific media encoding resources. Table 1 lists the elements within the OT_MediaReservation information flow.

Table 1: Contents of OT_MediaReservation

OT_MediaReservation			
Information element	Value	Request	Response
BearerId	Alphanumeric "handle"	M	M
QoS Parameters Qualifier	QoS parameters indicate total remaining budget QoS parameters indicate budget available per domain	O (see note 4)	O (see note 1)
Media descriptor	CodecDescr { CodecType, CodecParameters, SilenceSuppression, EchoCancelling, MediaPeakRate, MaxMediaFrameSize }, Priority	M (see note 2)	
MediaId	Alphanumeric "handle"		O (see note 3)
QoS Parameters	- PacketTransmissionRate - PacketLossRate - Jitter - Integrity - TransitDelay	O (see note 4)	
NextDomainAddress	Network domain address	O (see note 5)	
UserDomainAddress	Network specific address	O (see note 5)	
Egress Point (forward path)	Network specific address		O (see note 3)
Result	- Resource reserved - Rejection cause Media resource not available Media resource not supported		M
NOTE 1: This information element shall be included if the value of the transport parameters qualifier in the request is "QoS parameters indicate total remaining budget"			
NOTE 2: The media descriptor specifies the stronger requirements from the list of proposed codecs. Selection of the codec is done by the called user, so the actual media resources needed can be determined when media establishment is performed. The optional CodecDescr is present only when transcoding is performed.			
NOTE 3: Shall be included if information element is "Resource reserved".			
NOTE 4: Mandatory if QoS is required.			
NOTE 5: Exactly one of these information elements shall be present.			

5.2.1.1.2 OT_MediaEstablishment

OT_MediaEstablishment is a confirmed information flow that shall be sent across relationship ra from the Bearer Control entity to MFE1 to allocate previously reserved media encoding resources. Table 2 lists the elements within the OT_MediaEstablishment information flow.

Table 2: Contents of OT_MediaEstablishment

OT_MediaEstablishment			
Information element	Value	Request	Response
BearerId	Alphanumeric "handle"	M	M
MediaId	Alphanumeric "handle"	M	M
Next Domain Egress point (reverse path)	Network specific address	M	
Result	- Media allocated - Rejection cause - Unable to allocate resource - Resource no longer available		M

5.2.1.1.3 OT_MediaRelease

OT_MediaRelease is an unconfirmed information flow that shall be sent across relationship ra from the Bearer Control entity to MFE1 to release previously reserved or allocated media encoding resource. Table 3 lists the elements within the OT_MediaRelease information flow.

Table 3: Contents of OT_MediaRelease

OT_MediaRelease		
Information element	Value	Request
BearerId	Alphanumeric "handle"	M
MediaId	Alphanumeric "handle"	O (see note)
NOTE:	If the MediaId is not present all media resources associated to the specified BearerId are released.	

5.2.1.2 Relationship rb

5.2.1.2.1 MediaReservation

MediaReservation is a confirmed information flow that shall be sent across relationship rb from the Bearer Control entity to MFE2 to reserve specific media encoding resources. Table 4 lists the elements within the MediaReservation information flow.

Table 4: Contents of MediaReservation

MediaReservation			
Information element	Value	Request	Response
BearerId	Alphanumeric "handle"	M	M
QoS Parameters Qualifier	<ul style="list-style-type: none"> - QoS parameters indicate total remaining budget - QoS parameters indicate budget available per domain 	O (see note 4)	O (see note 1)
Media descriptor	CodecDescr { CodecType, CodecParameters, SilenceSuppression, EchoCancelling, MediaPeakRate, MaxMediaFrameSize }, [CodecDescr {...}] Priority	M (see note 2)	
MediaId	Alphanumeric "handle"		O (see note 3)
QoS Parameters	<ul style="list-style-type: none"> - PacketTransmissionRate - PacketLossRate - Jitter - Integrity - TransitDelay 	O (see note 4)	O (see note 1, see note 3)
PreviousDomainEgressAddress (forward path)	Network specific address	M	
NextDomainAddress	Network domain address	O (see note 5)	
UserDomainAddress	Network specific address	O (see note 5)	
Egress Point (forward path)	Network specific address		O (see note 3)
Result	<ul style="list-style-type: none"> - Resource reserved - Rejection cause <ul style="list-style-type: none"> - Media resource not available - Media resource not supported 		M
NOTE 1: This information element shall be included if the value of the transport parameters qualifier in the request is "QoS parameters indicate total remaining budget". NOTE 2: The media descriptor specifies the stronger requirements from the list of proposed codecs. Selection of the codec is done by the called user, so the actual media resources needed can be determined when media establishment is performed. The optional CodecDescr is present only when transcoding is performed. NOTE 3: Shall be included if information element is "Resource reserved". NOTE 4: Mandatory if QoS is required. NOTE 5: Exactly one of these information elements shall be present.			

NOTE: As in TIPHON Release 4, the topology of the session type supported always implies the media stream to be "bi-directional symmetrical", no information element for specifying the topology or the direction of mediastream is defined. As TIPHON Release 4 only supports symmetric single media stream sessions, a single media descriptor information element is sufficient in the reservation request and response.

5.2.1.2.2 MediaEstablishment

MediaEstablishment is a confirmed information flow that shall be sent across relationship ra from the Bearer Control entity to MFE2 to allocate previously reserved media encoding resources. Table 5 lists the elements within the MediaEstablishment information flow.

Table 5: Contents of MediaEstablishment

MediaEstablishment			
Information element	Value	Request	Response
BearerId	Alphanumeric "handle"	M	M
MediaId	Alphanumeric "handle"	M	M
Next Domain Egress point (reverse path)	Network specific address	M	
Egress point (reverse path)	Network specific address		O (see note)
Result	- Media allocated - Rejection cause - Unable to allocate resource - Resource no longer available		M
NOTE: Shall be present if Result is "Media allocated".			

5.2.1.2.3 MediaRelease

MediaRelease is an unconfirmed information flow that shall be sent across relationship ra from the Bearer Control entity to MFE2 to release previously reserved or allocated media encoding resource. Table 6 lists the elements within the MediaRelease information flow.

Table 6: Contents of MediaRelease

MediaRelease		
Information element	Value	Request
BearerId	Alphanumeric "handle"	M
MediaId	Alphanumeric "handle"	O (see note)
NOTE: If the MediaId is not present all media resources associated to the specified BearerId are released.		

5.2.1.2.4 MediaCapability

MediaCapability is a confirmed information flow that shall be sent across relationship ra from the Bearer Control entity to MFE2 to request media resource capabilities. Table 7 lists the elements within the MediaCapability information flow.

Table 7: Contents of MediaCapability

MediaCapability			
Information element	Value	Request	Response
BearerId	Alphanumeric "handle"	O(see note 1)	O (see note 1)
Information category	- capabilities supported - media resource state information	M	
MediaId	Alphanumeric "handle"	O(see note 2)	
Flow handle	Alphanumeric "handle"	O(see note 2)	
Media control resources	Media resource descriptor set		O(see note 3)
Media resource descriptor	MediaId Rx flow Tx flow Priority		O(see note 3)
Flow descriptor	Flow descriptor handle Priority Codec descriptor Transport descriptors		O(see note 3)
Result	- Information available - Information unavailable		M
NOTE 1: May be optional only if element "Information category" is "capabilities supported".			
NOTE 2: At least one of the information elements "MediaId" and "Flow handle" shall be present if the value of information element "Information category" is "media resource state information".			
NOTE 3: Information element "Media control resources", "Media resource descriptor", or "Flow descriptor" shall be present in the response if information element "Result" is "Information available".			

5.2.1.3 Relationship rc

5.2.1.3.1 TT_MediaReservation

TT_MediaReservation is a confirmed information flow that shall be sent across relationship rc from the Bearer Control entity to MFE3 to reserve specific media encoding resources. Table 8 lists the elements within the TT_MediaReservation information flow.

Table 8: Contents of TT_MediaReservation

TT_MediaReservation			
Information element	Value	Request	Response
BearerId	Alphanumeric "handle"	M	M
QoS Parameters Qualifier	<ul style="list-style-type: none"> - QoS parameters indicate total remaining budget - QoS parameters indicate budget available per domain 	O (see note 4)	O (see note 1)
Media descriptor	CodecDescr { CodecType, CodecParameters, SilenceSuppression, EchoCancelling, MediaPeakRate, MaxMediaFrameSize }, Priority	M (see note 2)	
MediaId	Alphanumeric "handle"		O (see note 3)
QoS Parameters	<ul style="list-style-type: none"> - PacketTransmissionRate - PacketLossRate - Jitter - Integrety - TransitDelay 	O (see note 4)	
PreviousDomainEgressAddress (forward path)	Network specific address	M	
UserDomainAddress	Network specific address	M	
Result	<ul style="list-style-type: none"> - Resource reserved - Rejection cause <ul style="list-style-type: none"> - Media resource not available - Media resource not supported 		M
NOTE 1: This information element shall be included if the value of the transport parameters qualifier in the request is "QoS parameters indicate total remaining budget".			
NOTE 2: The media descriptor specifies the stronger requirements from the list of proposed codecs. Selection of the codec is done by the called user, so the actual media resources needed can be determined when media establishment is performed.			
NOTE 3: Shall be included if information element is "Resource reserved".			
NOTE 4: Mandatory if QoS is required.			

5.2.1.3.2 TT_MediaEstablishment

TT_MediaEstablishment is a confirmed information flow that shall be sent across relationship rc from the Bearer Control entity to MFE3 to allocate previously reserved media encoding resources. Table 9 lists the elements within the TT_MediaEstablishment information flow.

Table 9: Contents of TT_MediaEstablishment

TT_MediaEstablishment			
Information element	Value	Request	Response
BearerId	Alphanumeric "handle"	M	M
MediaId	Alphanumeric "handle"	M	M
Egress point (reverse path)	Network specific address		O (see note)
Result	- Media allocated - Rejection cause - Unable to allocate resource - Resource no longer available		M
NOTE: Shall be present if Result is "Media allocated".			

5.2.1.3.3 TT_MediaRelease

TT_MediaRelease is an unconfirmed information flow that shall be sent across relationship ra from the Bearer Control entity to MFE3 to release previously reserved or allocated media encoding resource. Table 10 lists the elements within the TT_MediaRelease information flow.

Table 10: Contents of TT_MediaRelease

TT_MediaRelease		
Information element	Value	Request
BearerId	Alphanumeric "handle"	M
MediaId	Alphanumeric "handle"	O (see note)
NOTE: If the MediaId is not present all media resources associated to the specified BearerId are released.		

5.2.2 Timers

5.2.2.1 Media resource reservation hold timer

A media Reservation Hold Timer is used to ensure that reserved media resources are not held indefinitely if a MediaEstablishment request information flow is not received within a certain time after reserving the resources. The period of the Reservation Hold Timer is implementation dependent but shall be in the range of 8 s to 15 s.

5.2.3 Information flow sequences

A standard specifying TIPHON meta-protocols for media control signalling shall provide signalling procedures in support of the information flow sequences specified below. In addition, signalling procedures should be provided to cover other sequences arising from error situations, interactions with simple call and interactions with other service capabilities.

NOTE: In this release only the information flow sequences for the gateway media control entity (MFE2) is illustrated.

In the figures, media control signalling information flows are represented by solid arrows. Within a column representing a media control signalling functional entity, the numbers refer to functional entity actions listed in clause 5.3.

The following abbreviations are used:

- req request;
- resp response.

5.2.3.1 Normal operation

Figure 3 shows the information flows for successful reservation and establishment of media resources.

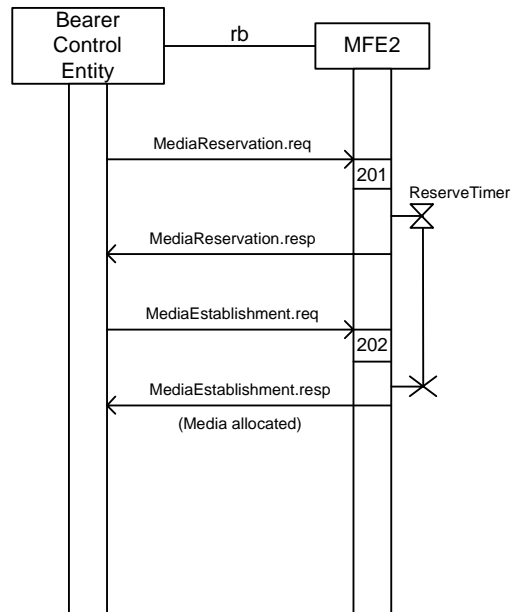


Figure 3: Information flows for successful media reservation and establishment

Figure 4 shows the information flows for release of media resources.

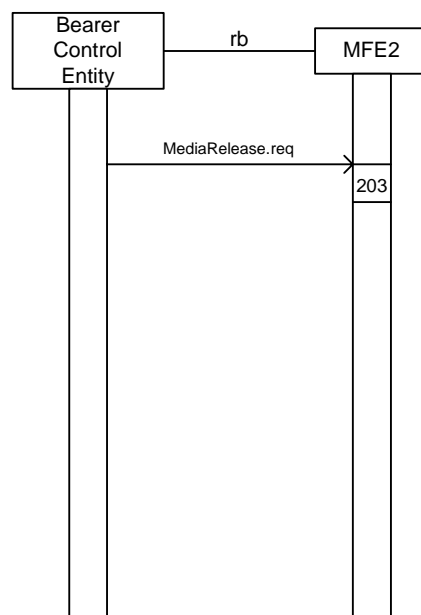


Figure 4: Information flows for release of media resources

Figure 5 shows the information flows for media resource capability information.

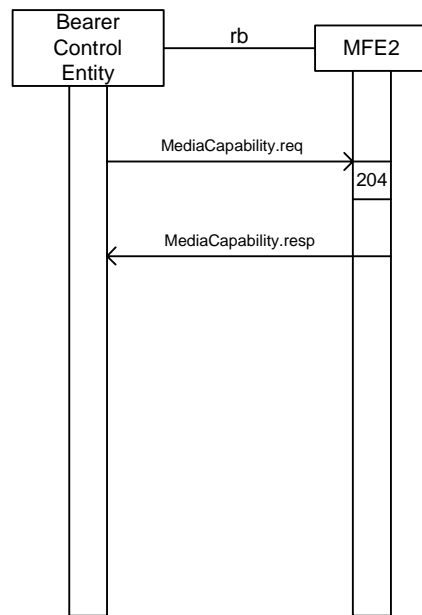


Figure 5: Information flows for capability information request

5.2.3.2 Exceptional behaviour

Figure 6 shows unsuccessful media resource establishment due to required resource not being available.

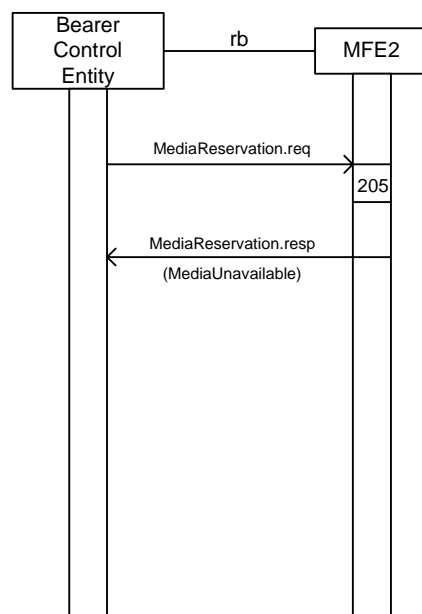


Figure 6: Unsuccessful media establishment due to requested resource not available

Figure 7 shows unsuccessful media resource establishment due to media resource reserve time expiration.

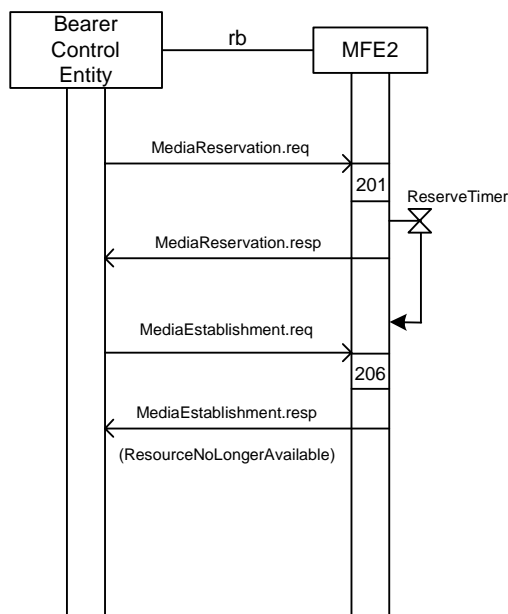


Figure 7: Unsuccessful media establishment due to reservation timeout

5.3 Media control functional entity actions

The following conventions are used to identify information flows in the descriptions of MFE actions:

- an information flow is referred to as a "request" at the MFE that sends it and as an "indication" at the MFE that receives it;
- the corresponding confirmation is referred to as a "response" at the MFE that sends it and as a "confirmation" at the MFE that receives it.

The following MFE actions shall occur at the points indicated in the figures of clause 5.2.3.

5.3.1 Actions of MFE2

- 201: On receipt of a `MediaReservation` indication from the Bearer Control entity (BC), determine if requested media resources are available, if so reserve the resources, start reservation timer, prepare a positive `MediaReservation` response indicating the bearer characteristics required to support the media encoding, and send it to BC.
- 202: On a `MediaEstablishment` indication from BC, if the reservation timer has not expired and reserved media is available, stop the reservation timer, allocate the resource, and send a `MediaEstablishment` response with result "Media allocated".
- 203: On receiving a `MediaRelease` indication from the BC when media resources are reserved or established, release the media resources identified by the handle.
- 204: When a `MediaCapability` indication is received from the BC check the request, if possible retrieve the requested media resource information, prepare a `MediaCapability` response and send it to BC.
- 205: On receipt of a `MediaReservation` indication from the Bearer Control entity (BC), if requested media resources are not available, send a `MediaReservation` response with result "Media unavailable".
- 206: On a `MediaEstablishment` indication from BC, when the reservation timer has expired, send `MediaEstablishment` response with result "Resource no longer available" to BC.

5.4 Media Control Functional entity behaviour

The behaviour specified in this clause is intended to illustrate typical MFE behaviour in terms of information flows sent and received.

The behaviour of MFE2 is shown using the Specification and Description Language (SDL) defined in ITU-T Recommendation Z.100 [4].

5.4.1 Information flows specified as ASN.1 operations

For the purposes of modelling media control service signalling in SDL, the information flows for MFE2 have been specified using the Abstract Syntax Notation 1 (ASN.1) defined in ITU-T Recommendation X.680 [5]. The ASN.1 is shown in table 11.

Table 11: Media control service information flows specified as ASN.1

```
MediaControl_Types DEFINITIONS ::=
BEGIN

-- Data structures for the media control service signals --

MediaReservationReq_Type ::= SEQUENCE
{ bearerId      BearerIdType,
  qosParmQualifier  ParamQualifierType OPTIONAL,
  mediaDescriptor  MediaDescriptorType,
  qosParms         QoSParametersType OPTIONAL,
  previousDomEgressFw  NetworkSpecificAddrType,
  nextDomainAddress  NetworkDomainAddrType OPTIONAL,
  userDomainAddress  NetworkSpecificAddrType OPTIONAL
}

MediaReservationResp_Type ::= SEQUENCE
{ bearerId      BearerIdType,
  qosParmQualifier  ParamQualifierType OPTIONAL,
  mediaId         MediaIdType OPTIONAL,
  qosParameters    QoSParametersType OPTIONAL,
  egressPointFw    NetworkSpecificAddrType OPTIONAL,
  mediaResResult   MediaResResultType
}

MediaEstablishmentReq_Type ::= SEQUENCE
{ bearerId      BearerIdType,
  mediaId       MediaIdType,
  nextDomainEgressRev  NetworkSpecificAddrType
}

MediaEstablishmentResp_Type ::= SEQUENCE
{ bearerId      BearerIdType,
  mediaId       MediaIdType,
  egressPointRev  NetworkSpecificAddrType OPTIONAL,
  mediaEstabResult  MediaEtabResultType
}

MediaCapabilityReq_Type ::= SEQUENCE
{ bearerId      BearerIdType OPTIONAL,
  infoCategory  CapabilityInfoType,
  mediaId       MediaIdType OPTIONAL,
  flowResourceHandle  FlowDescriptorHandleType OPTIONAL
}

MediaCapabilityResp_Type ::= SEQUENCE
{ bearerId      BearerIdType OPTIONAL,
  mediaControlResources  MediaCapabilitiesType OPTIONAL,
  mediaResource  MediaResourceDescrType OPTIONAL,
  flowDescr     FlowDescriptorType OPTIONAL,
  result        CapabilityResultType
}

MediaReleaseReq_Type ::= SEQUENCE
{ bearerId      BearerIdType,
  mediaId       MediaIdType OPTIONAL
}

```

```

-- Media control information element types --

BearerIdType ::= Integer

BearerIntegrityType ::= ENUMERATED
{ timeSlotSequenceIntegrity,
  serviceDataUnitIntegrity,
  unstructured,
  dataSequenceIntegrity,
  integrity8kHz
}

CapabilityInfoType ::= ENUMERATED
{ capabilitiesSupported, -- Supported media capabilities
  stateInformation      -- State dependent session, flow, or media resource information
}

CapabilityResultType ::= ENUMERATED
{ capabilityIdentified,
  capabilityNotFound
}

CodecCapabilitiesType ::= SEQUENCE OF CodecDescrType

CodecDescrType ::= SEQUENCE
{ codecId           CodecIdType,
  codecParms        CodecParametersType,
  silenceSuppressionEnabled Boolean,
  echoCancelling    Boolean,
  mediaPeakRate     FrameRateType,
  maxMediaFrameSize FrameCountType
}

CodecIdType ::= Visiblestring(SIZE( 1..15))

CodecParametersType ::= SEQUENCE
{ framesPerPacket      FrameCountType,
  maxCodecFrameSize   FrameSizeType,
  codecSpecificParameters Visiblestring
}

FlowCapabilityType ::= SEQUENCE
{ bearerPlaneTypes      Visiblestring, -- Frame Relay, IP, etc
  connectionTopologyTypes Visiblestring, -- PtoP, PtoMP, conference bridge
}

FlowDescriptorHandleType ::= Integer

FlowDescriptorType ::= SEQUENCE
{ flowDescriptorHandle FlowDescriptorHandleType OPTIONAL,
  ingressConnAddr      NetworkSpecificAddrType OPTIONAL,
  egressConnAddr       NetworkSpecificAddrType OPTIONAL,
  codecDescriptor      CodecDescrType OPTIONAL,
  egressCodecDescr     CodecDescrType OPTIONAL, -- Indicate codec on egress when transcoding
  ingressQosParms      QoSParametersType OPTIONAL,
  egressQosParms       QoSParametersType OPTIONAL,
  ingressCapabs        FlowCapabilityType OPTIONAL,
  egressCapabs         FlowCapabilityType OPTIONAL
}

FourOctetsType ::= Octet_String( SIZE(4) )

FrameCountType ::= Integer(1..maxFrameCount)

FrameRateType ::= Integer( 1..255)

FrameSizeType ::= Integer(0..255)

IPAddressType ::= CHOICE
{ ipv4Address IPv4AddressType,
  ipv6Address IPv6AddressType
}

IPv4AddressType ::= SEQUENCE
{
  addr FourOctetsType,
  port TwoOctetType
}

```

```

}

IPv6AddressType ::= SEQUENCE
{
  addr  SixteenOctetsType,
  port  TwoOctetType
}

maxFrameCount Integer ::= 256

MediaCapabilitiesType ::= SEQUENCE OF MediaResourceStatusDescrType

MediaDescriptorType ::= SEQUENCE
{
  mediaIdHandle      MediaIdType OPTIONAL,
  codecDescr        CodecDescrType,
  codecDescrOptional CodecDescrType OPTIONAL, -- present if transcoding in use
  connectionPriority PriorityType
}

MediaEtabResultType ::= ENUMERATED
{
  mediaAllocated,
  unableToAllocateResource,
  resourceNoLongerAvailable
}

MediaIdType ::= Integer

MediaResourceDescrType ::= SEQUENCE
{
  mediaResourceHandle MediaIdType OPTIONAL,
  rxFlowDescriptor    FlowDescriptorType OPTIONAL,
  txFlowDescriptor    FlowDescriptorType OPTIONAL,
  connectionPriority  PriorityType OPTIONAL,
  codecsSupported     CodecCapabilitiesType OPTIONAL
}

MediaResourceStatusDescrType ::= SEQUENCE
{
  mediaResourceStatus ResourceStatusType,
  mediaResourceDescr  MediaResourceDescrType
}

MediaResResultType ::= ENUMERATED
{
  mediaReserved,
  mediaResourceNotAvailable,
  mediaResourceNotSupported,
  destinationUnknown
}

MicroSeconds ::= Integer( 0 .. 1000000 )

NetworkDomainAddrType ::= CHOICE
{
  ipv4Domain  FourOctetsType,
  ipv6Domain  SixteenOctetsType
}

NetworkSpecificAddrType ::= CHOICE
{
  slotNumber SlotNumberType,
  ipAddress  IPAddressType
}

OneOctetType ::= Octet_String( SIZE(1) )

ParamQualifierType ::= ENUMERATED
{
  totalRemainingBudget,
  budgetAvailableForDomain
}

PercentX1000 ::= Integer ( 0 : 100000 )

PriorityType ::= ENUMERATED
{
  normal,
  emergency
}

QoSParametersType ::= SEQUENCE
{
  packetTxRate      TrafficDescrType,
  packetLossRate    PercentX1000,
  maxDelayVariation MicroSeconds,
  bearerIntegrity   BearerIntegrityType,
}

```

```
transitDelay      MicroSeconds
}

ResourceStatusType ::= ENUMERATED
{ available,
  reserved,
  established
}

SixteenOctetsType ::= Octet_String( SIZE(16) )

SlotNumberType ::= Integer

TrafficDescrType ::= SEQUENCE
{ peakFrameRate   FrameRateType,
  framesPerPacket FrameCountType
}

TwoOctetType ::= Octet_String( SIZE(2) )

END
```

5.4.2 Behaviour of MFE2

The behaviour of MFE2 is shown in the SDL process diagram in figure 8.



Figure 8: SDL process diagram for functional entity MFE2 (1 of 9)

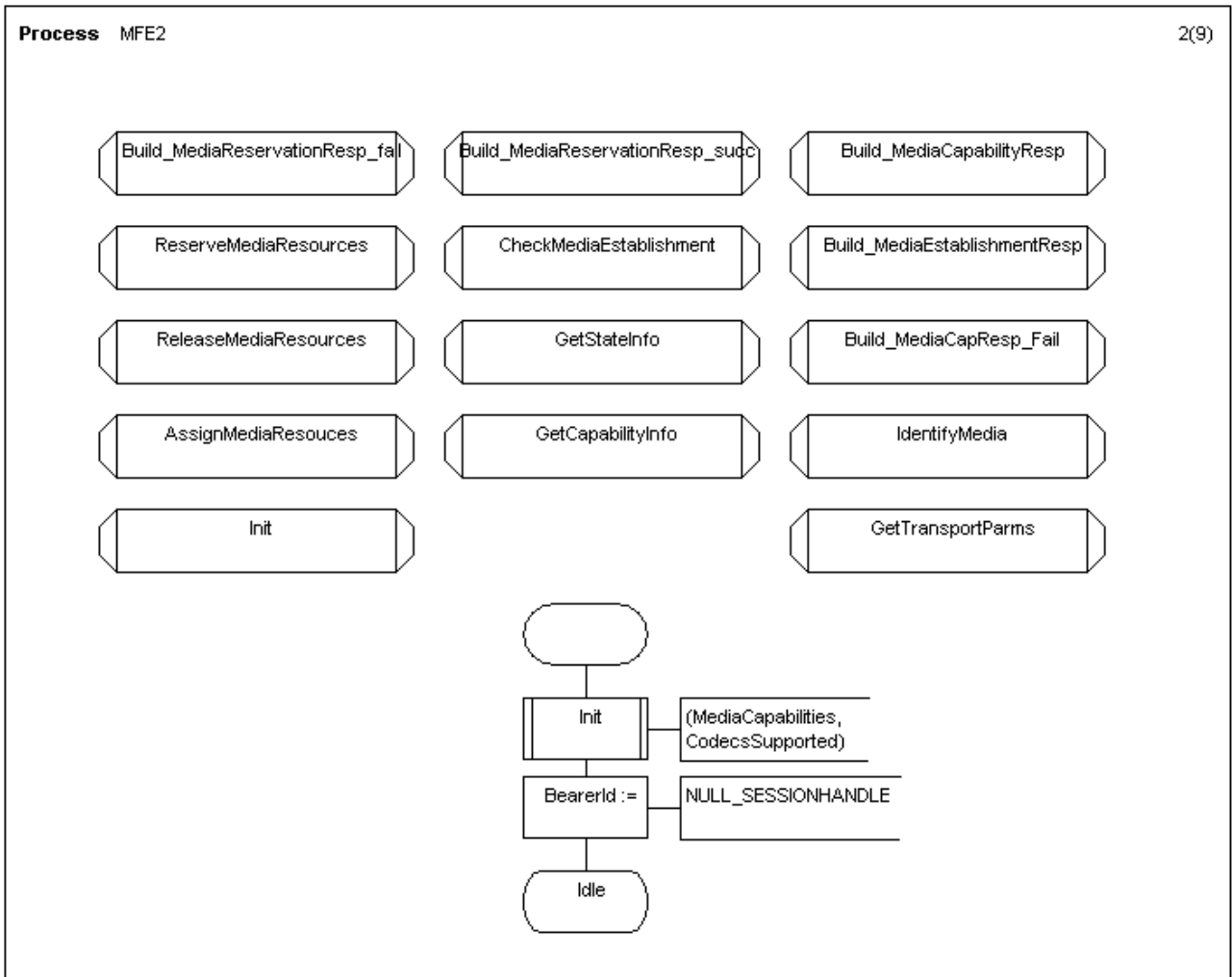


Figure 8: SDL process diagram for functional entity MFE2 (2 of 9)

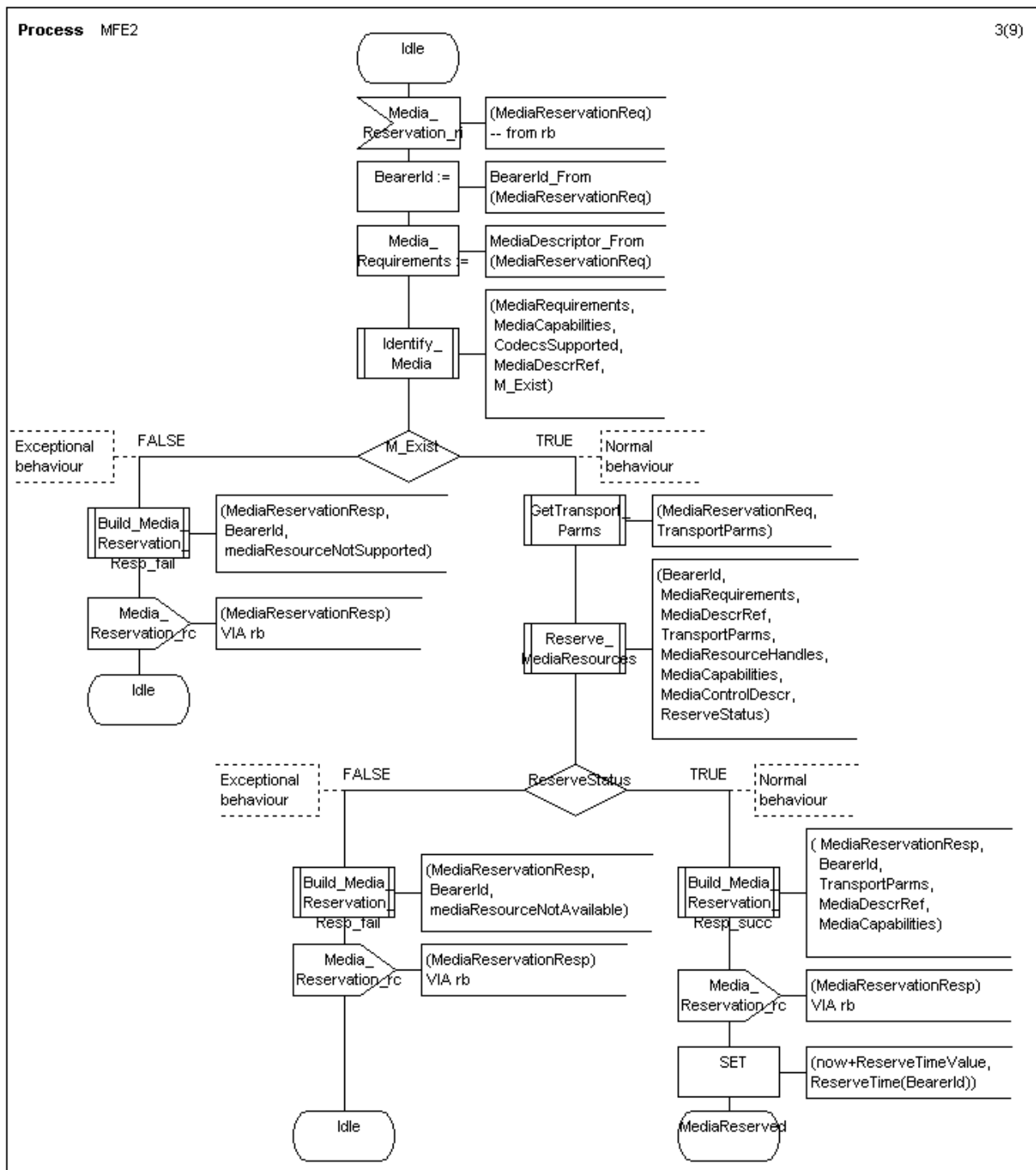


Figure 8:SDL process diagram for functional entity MFE2 (3 of 9)

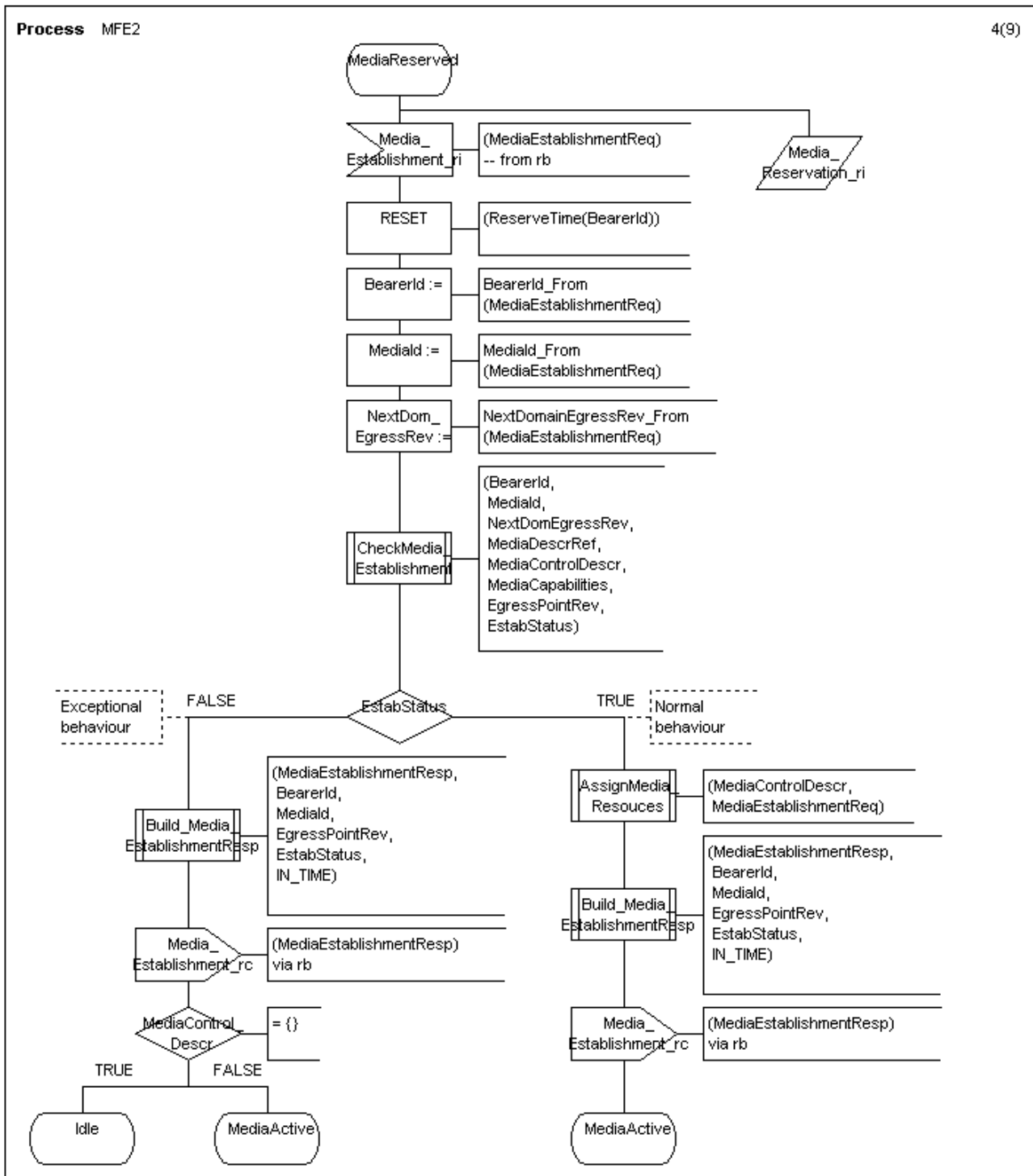


Figure 8: SDL process diagram for functional entity MFE2 (4 of 9)

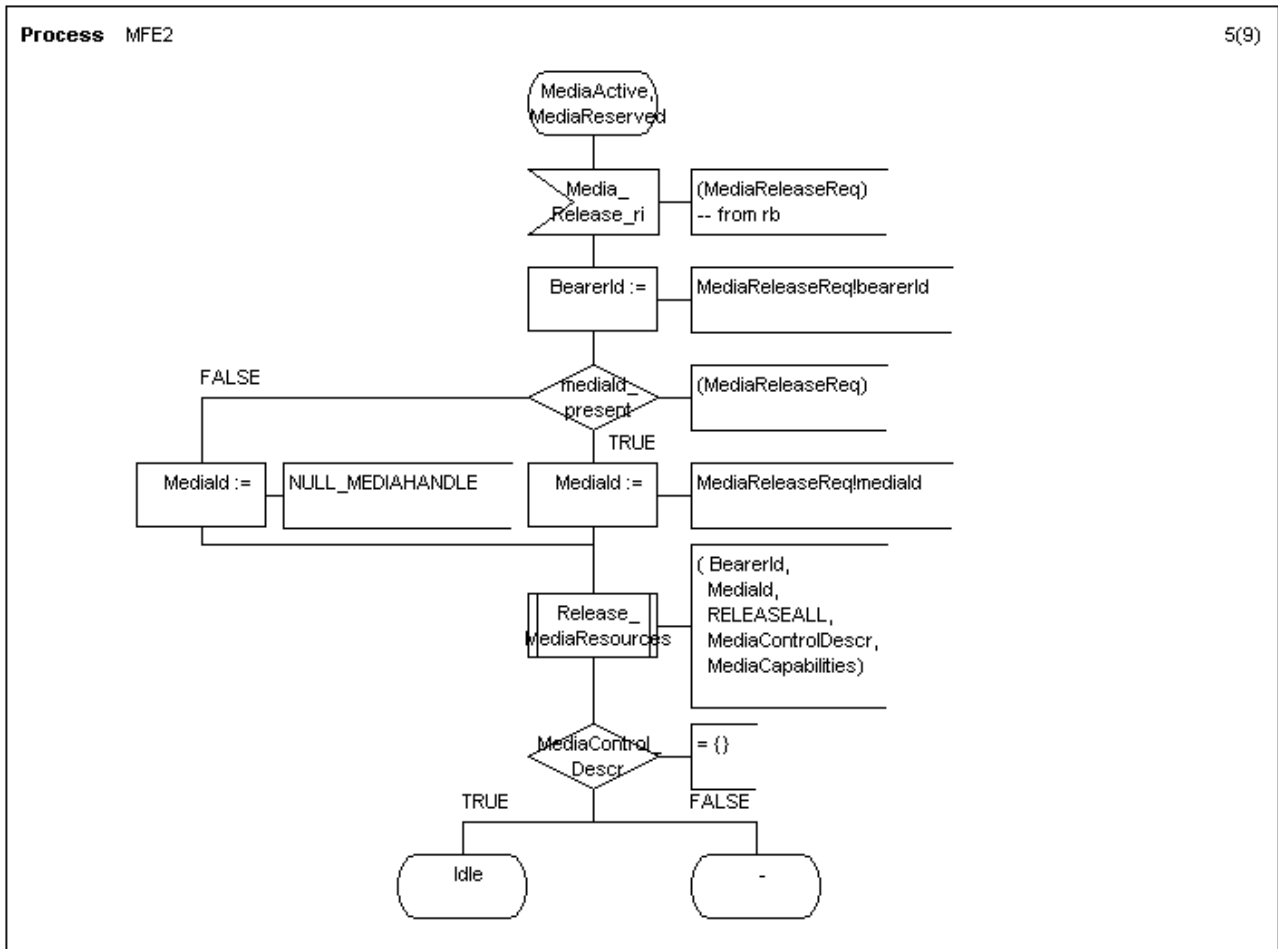


Figure 8: SDL process diagram for functional entity MFE2 (5 of 9)

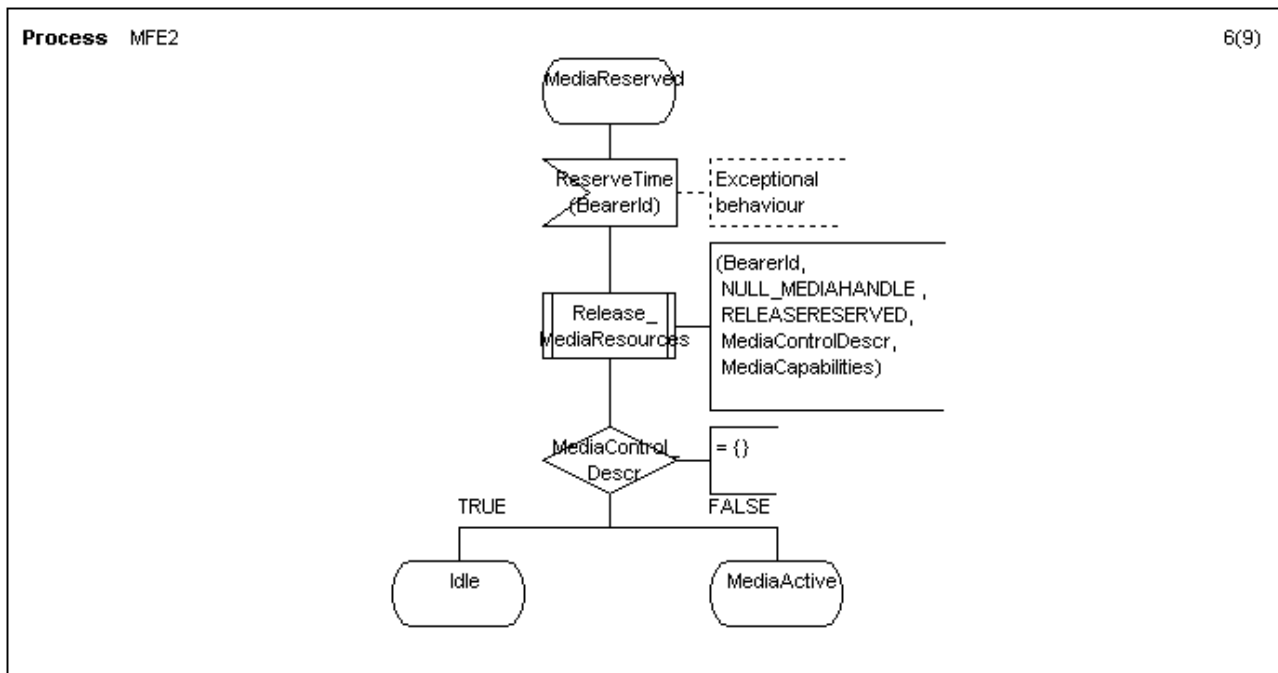


Figure 8: SDL process diagram for functional entity MFE2 (6 of 9)

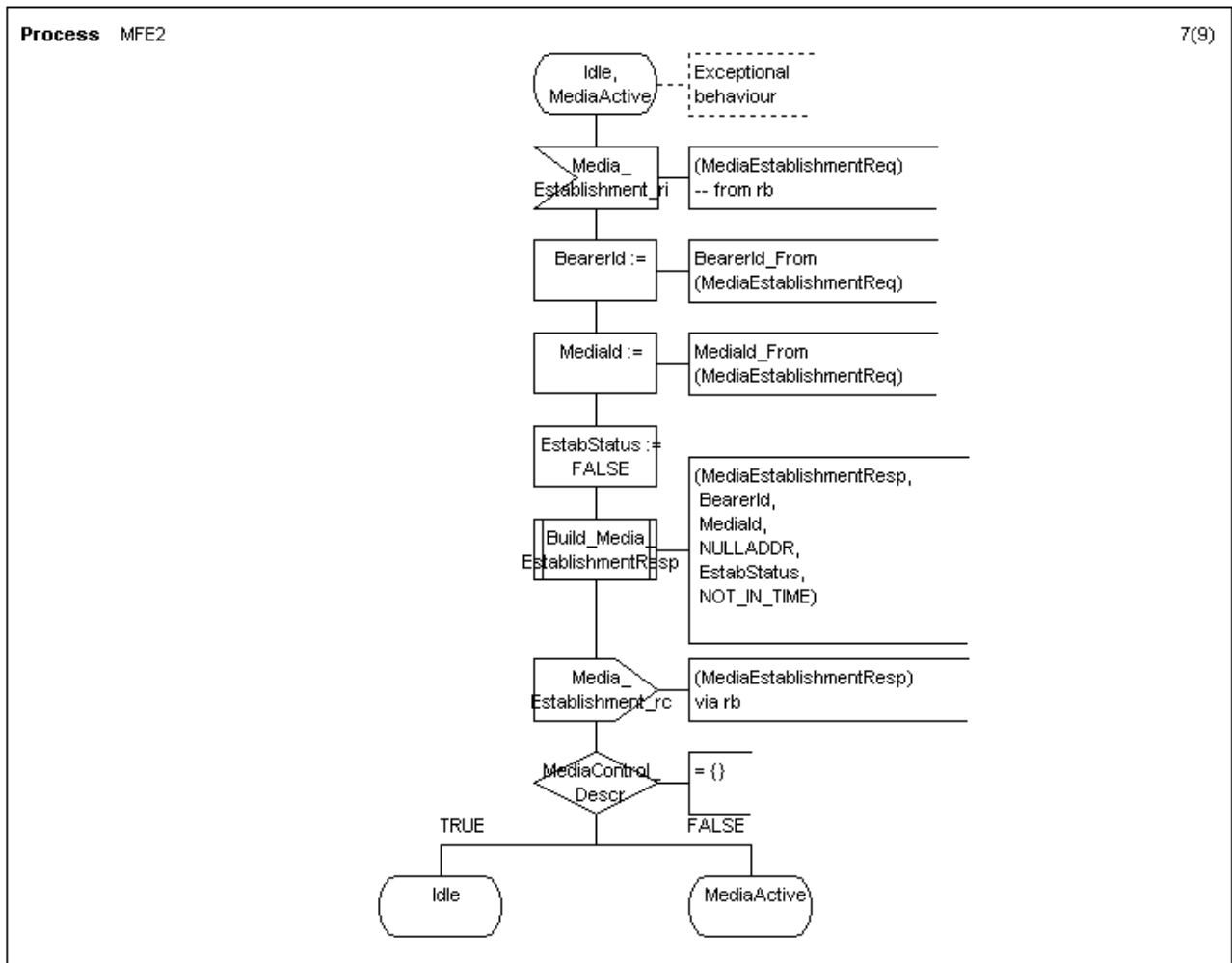


Figure 8: SDL process diagram for functional entity MFE2 (7 of 9)

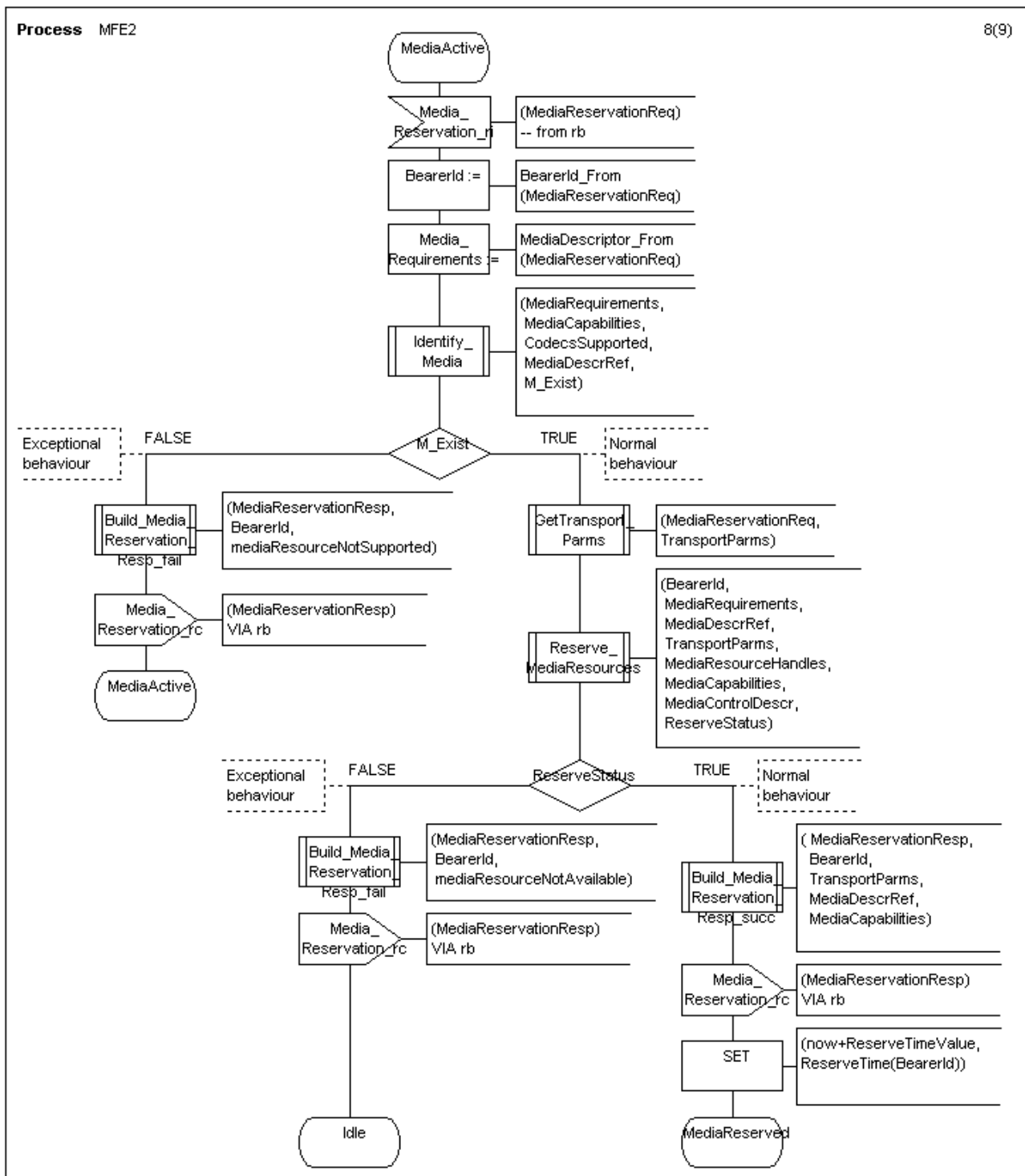


Figure 8: SDL process diagram for functional entity MFE2 (8 of 9)

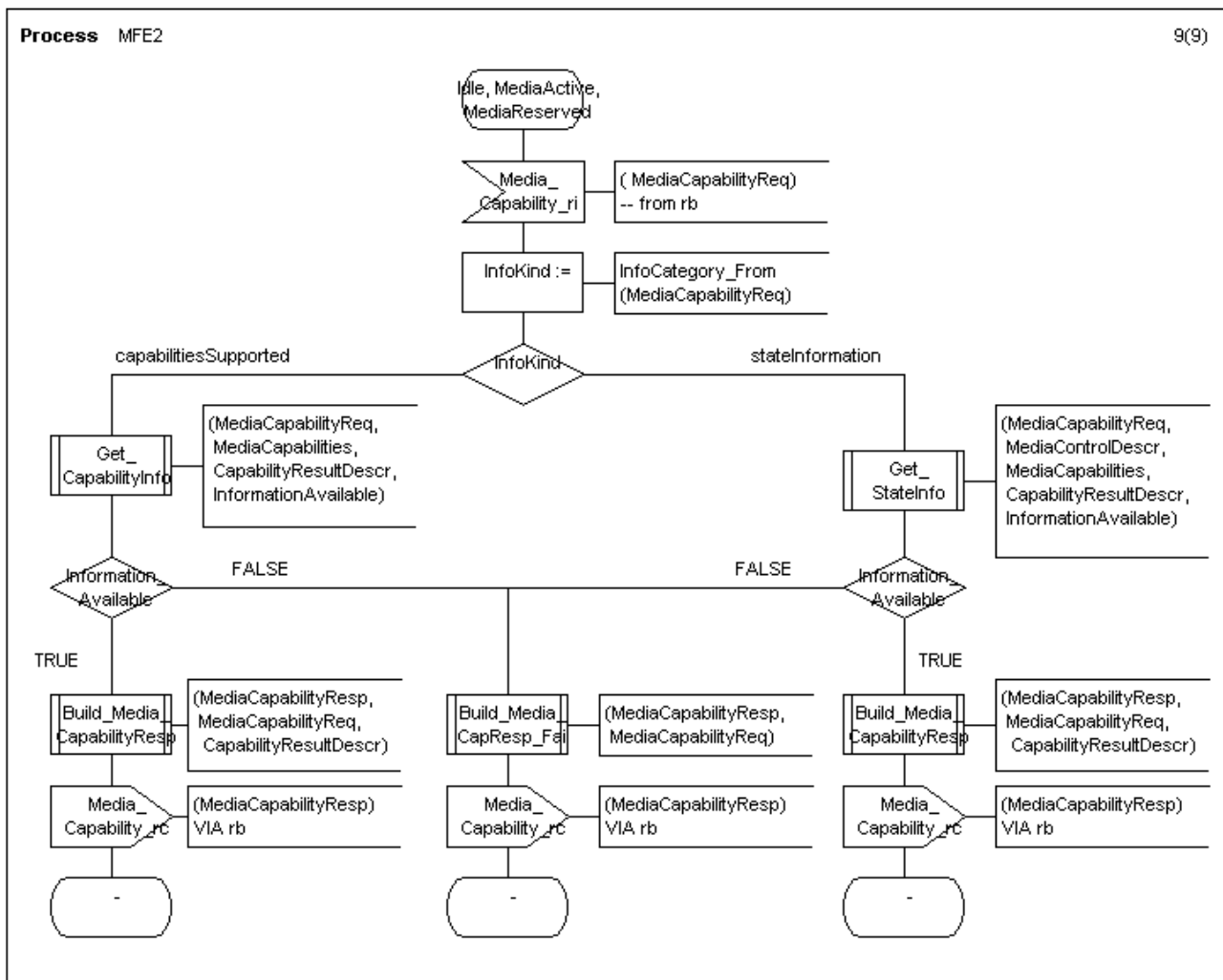


Figure 8: SDL process diagram for functional entity MFE2 (9 of 9)

5.3 Allocation of functional entities to domains

TS 101 314 [2] defines an abstract architecture for TIPHON based on domains and functional groups. In the instantiations (scenarios) of the media control functional model, the functional entity may be allocated to this architecture.

In all scenarios MFE2 is allocated to the Service domain. This allocation may exist in the different functional groups, terminal, serving network, or home network functional group.

Annex A (normative): Simulation and validation SDL model

The complete SDL model used for simulation and validation is provided in separate files. The SDL model is included in file "TS101882-4SDL.cbf" and the ASN.1 definition is included in file "mediacontrol_types.pr". The SDL model is also included in PDF format in file "TS101882-4SDL.pdf". All These files are contained in archive ts_10188204v040101p0.zip which accompanies the present document.

History

Document history		
V1.1.1	May 2002	Publication as TS 101 882
V4.1.1	November 2003	Publication