

Source: SA5 (Telecom Management)
Title: 4 Rel-6 CRs 32.661/2/3/4 (Kernel Configuration Management: requirements/ information service/ CORBA & CMIP solution set) "Add requirement for the emission of notifyCMSynchronizationRecommended notification"
Document for: Approval
Agenda Item: 7.5.3

Alignment of CMCC/SA5 CM framework

Doc-1st-Level	Spec	CR	Rev	Phase	Subject	Cat	Ver-Current	Doc-2nd-Level	Workitem	Remarks
SP-030145	32.661	002	-	Rel-6	Add requirement for the emission of notifyCMSynchronizationRecommended notification	B	5.1.0	S5-036335	OAM-NIM	Parent CR.
SP-030145	32.662	001	-	Rel-6	Add description of notifyCMSynchronizationRecommended notification for KernelCM IRP.	B	5.0.0	S5-027032	OAM-NIM	Child CR.
SP-030145	32.663	002	-	Rel-6	Add IDL definition of notifyCMSynchronizationRecommended notification for KernelCM IRP	B	5.0.0	S5-027033	OAM-NIM	Grandchild CR.
SP-030145	32.664	001	-	Rel-6	Add GDMO definition of notifyCMSynchronizationRecommended notification for KernelCM IRP	B	5.0.0	S5-036334	OAM-NIM	Grandchild CR.

CHANGE REQUEST

32.661 CR 002 # rev **-** # Current version: **5.1.0**

For **HELP** on using this form, see bottom of this page or look at the pop-up text over the # symbols.

Proposed change affects: UICC apps ME Radio Access Network Core Network

Title:	#	Add requirement for the emission of notifyCMSynchronizationRecommended notification
Source:	#	S5
Work item code:	#	OAM-NIM
	Date:	# 28/02/2003
Category:	#	B
		Release: # Rel-6
		Use <u>one</u> of the following categories:
		<ul style="list-style-type: none"> F (correction) A (corresponds to a correction in an earlier release) B (addition of feature), C (functional modification of feature) D (editorial modification)
		Use <u>one</u> of the following releases:
		<ul style="list-style-type: none"> 2 (GSM Phase 2) R96 (Release 1996) R97 (Release 1997) R98 (Release 1998) R99 (Release 1999) Rel-4 (Release 4) Rel-5 (Release 5) Rel-6 (Release 6)
		Detailed explanations of the above categories can be found in 3GPP TR 21.900 .

Reason for change:	#	The Kernel CM IRP can be improved by a capability to notify the NM that configuration information in the managed system needs to be synchronized. With the increasing complexity of managed systems and NM it is known that configuration information can deviate between the NM and Managed Systems. This notification will ensure timely synchronization of the configuration information of the managed system between the NM and Managed System.
Summary of change:	#	Add requirement for the emission of notifyCMSynchronizationRecommended notification.
Consequences if not approved:	#	

Clauses affected:	#	4.2								
Other specs affected:	#	<table border="1" style="display: inline-table; border-collapse: collapse; text-align: center;"> <tr> <td style="width: 20px;">Y</td> <td style="width: 20px;">N</td> </tr> <tr> <td style="width: 20px;"> </td> <td style="width: 20px;">X</td> </tr> <tr> <td style="width: 20px;"> </td> <td style="width: 20px;">X</td> </tr> <tr> <td style="width: 20px;">X</td> <td style="width: 20px;"> </td> </tr> </table> Other core specifications # Test specifications # O&M Specifications # 32.662, 32.663, 32.664	Y	N		X		X	X	
Y	N									
	X									
	X									
X										
Other comments:	#	This is a Parent CR to 32662CR001 S5-027032 This is a Grandparent CR to 32663CR002 S5-027033 This is a Grandparent CR to 32664CR001 S5-036334 Alignment of CMCC/SA5 CM framework								

How to create CRs using this form:

Change in Clause 4.2

4.2 Kernel CM Requirements

The IS defined by this IRP shall include the following operations that may be invoked by the IRP Manager to retrieve management information from the IRP Agent:

- An operation to retrieve the Network Resource IRP SS document versions (IRP Versions) of the NRM Solution Sets that are supported by each Network Resource IRP present in the subject implementation.

The IS defined by this IRP shall include a notification capability by which the IRP Agent sends management information to the IRP Manager whenever an event of a specific type occurs. Specifically, the following types of notifications shall be supported:

- A notification that identifies the instance of a managed object that was created.
- A notification that identifies one or more instances of a managed object that were deleted.
- A notification that identifies the values of one or more attributes of a managed object instance that were changed.
- [A notification which identifies that part of or the whole configuration information of managed system should be synchronized.](#)

End of Change in Clause 4.2

Annex A (informative): Change history

Change history							
Date	TSG #	TSG Doc.	CR	Rev	Subject/Comment	Old	New
Mar 2002	S_15	SP-020034	--	--	Submitted to TSG SA #15 for Information	1.0.0	

CHANGE REQUEST

32.664 CR 001
rev -
Current version:
5.0.0

For **HELP** on using this form, see bottom of this page or look at the pop-up text over the ¶ symbols.

Proposed change affects: UICC apps ME Radio Access Network Core Network

Title:	¶ Add GDMO definition of notifyCMSynchronizationRecommended notification for KernelCM IRP		
Source:	¶ S5		
Work item code:	¶ OAM-NIM Date: ¶ 28/02/2003		
Category:	<table style="width: 100%; border: none;"> <tr> <td style="width: 50%; vertical-align: top;"> ¶ B Use <u>one</u> of the following categories: F (correction) A (corresponds to a correction in an earlier release) B (addition of feature), C (functional modification of feature) D (editorial modification) Detailed explanations of the above categories can be found in 3GPP TR 21.900. </td> <td style="width: 50%; vertical-align: top;"> Release: ¶ Rel-6 Use <u>one</u> of the following releases: 2 (GSM Phase 2) R96 (Release 1996) R97 (Release 1997) R98 (Release 1998) R99 (Release 1999) Rel-4 (Release 4) Rel-5 (Release 5) Rel-6 (Release 6) </td> </tr> </table>	¶ B Use <u>one</u> of the following categories: F (correction) A (corresponds to a correction in an earlier release) B (addition of feature), C (functional modification of feature) D (editorial modification) Detailed explanations of the above categories can be found in 3GPP TR 21.900 .	Release: ¶ Rel-6 Use <u>one</u> of the following releases: 2 (GSM Phase 2) R96 (Release 1996) R97 (Release 1997) R98 (Release 1998) R99 (Release 1999) Rel-4 (Release 4) Rel-5 (Release 5) Rel-6 (Release 6)
¶ B Use <u>one</u> of the following categories: F (correction) A (corresponds to a correction in an earlier release) B (addition of feature), C (functional modification of feature) D (editorial modification) Detailed explanations of the above categories can be found in 3GPP TR 21.900 .	Release: ¶ Rel-6 Use <u>one</u> of the following releases: 2 (GSM Phase 2) R96 (Release 1996) R97 (Release 1997) R98 (Release 1998) R99 (Release 1999) Rel-4 (Release 4) Rel-5 (Release 5) Rel-6 (Release 6)		

Reason for change:	¶ The KernelCM IRP lacks the notification which informs NM that great deal of changed configuration information in the managed system needs to be synchronized.
Summary of change:	¶ Add the GDMO definition of notifyCMSynchronizationRecommended notification.
Consequences if not approved:	¶ If there are large changes generated in the network, it is inefficient to send lots of notifications such as “notifyObjectCreation”, “notifyObjectDeletion” or “notifyObjectAttributeValueChange” to IRPManager through Itf-N.

Clauses affected:	¶ 4.2.3, 5, 6												
Other specs affected:	<table style="border: none;"> <tr> <td style="border: 1px solid black; padding: 2px; text-align: center;">Y</td> <td style="border: 1px solid black; padding: 2px; text-align: center;">N</td> <td style="padding: 0 10px;">Other core specifications</td> <td>¶</td> </tr> <tr> <td style="border: 1px solid black; padding: 2px; text-align: center;">X</td> <td style="border: 1px solid black; padding: 2px; text-align: center;">X</td> <td style="padding: 0 10px;">Test specifications</td> <td></td> </tr> <tr> <td style="border: 1px solid black; padding: 2px; text-align: center;">X</td> <td style="border: 1px solid black; padding: 2px; text-align: center;">X</td> <td style="padding: 0 10px;">O&M Specifications</td> <td></td> </tr> </table>	Y	N	Other core specifications	¶	X	X	Test specifications		X	X	O&M Specifications	
Y	N	Other core specifications	¶										
X	X	Test specifications											
X	X	O&M Specifications											
Other comments:	¶ This is a Child CR of 32662CR001 S5-027032 Alignment of CMCC/SA5 CM framework												

How to create CRs using this form:

1. Scope

The present document specifies the Common Management Information Protocol (CMIP) Solution Set (SS) for the Kernel Configuration Management IRP: Information Service defined in 3GPP TS 32.662 [7]. In detail:

- Clause 4 contains an introduction to some concepts that are the base for some specific aspects of the CMIP interfaces.
- Clause 5 contains the GDMO definitions for the Kernel Configuration Management IRP over the CMIP interfaces
- Clause 6 contains the ASN.1 definitions supporting the GDMO definitions provided in clause 5.

This Solution Set specification is related to 3GPP TS 32.662 V5.1.X.

4 Basic Aspects

4.1 Architectural Aspects

The architecture of the notifications of the Kernel CM IRP CMIP Solution Set is based on the object management function as defined in ITU-T X.730 [11]. The operations of this IRP are mapped to GDMO actions defined in this document.

4.2 Mapping

The semantics of the Kernel Configuration Management IRP are defined in 3GPP TS 32.662 [7]. The definitions of the management information defined there are independent of any implementation technology and protocol. This clause maps these protocol independent definitions onto their equivalents of the CMIP Solution Set of the Kernel Configuration Management IRP.

4.2.1 Mapping of Information Object Classes

Table 1 maps the IOCs defined in 3GPP TS 32.362 [7] onto the corresponding managed object classes (MOCs) defined in this CMIP Solution Set. The MOCs are qualified either as Mandatory (M) or Optional (O).

Table 1: Mapping of IOCs

IS IOC	CMIP SS MOC	Qualifier
KernelCmIRP	KernelCmIRP	M

4.2.2 Mapping of Operations

Table 2 and table 3 map the operations defined in 3GPP TS 32.362 [7] and 3GPP TS 32.312 [4] onto corresponding GDMO actions. The operations are qualified either as Mandatory (M) or Optional (O).

Table 2: Mapping of operations of the Kernel Configuration Management IRP: IS

IS Interface	IS Operation	GDMO Action or CMISE of CMIP SS	Qualifier
KernelCmOperations	GetNRMIRPVersion	getNRMIRPVersion	M

Table 3: Mapping of operations inherited from the Generic IRP Management: IS

IS Interface	IS Operation	GDMO Action or CMISE of CMIP SS	Qualifier
GenericIRPVersionOperations	GetIRPVersion	getKernelCmIRPVersion	M
GenericIRPProfileOperations	getOperationProfile	getKernelCmIRPOperationProfile	O
	getNotificationProfile	getKernelCmIRPNotificationProfile	O

4.2.2.1 Mapping of Operation Parameters

The tables in the following subclauses list the parameters of each operation defined in 3GPP TS 32.362 [7] and their equivalents in the CMIP Solution Set.

4.2.2.1.1 Parameter Mapping of the Operation *getNRMIRPVersion*

The IRPManager is able to retrieve NRM SS versions supported by an IRPAgent by using the GDMO action *getNRMIRPVersion*. This action shall be implemented by using the CMISE M-ACTION service [8].

Table 4: Parameter mapping of the operation *getNRMIRPVersion*

IS Parameter	IN/OUT	CMIP SS Equivalent	Qualifier
versionNumberList	OUT	versionNumberList	M
vSEVersionNumberList	OUT	vSEVersionNumberList	M
status	OUT	status	M

Change in Clause 4.2.3

4.2.3 Mapping of Notifications

Table 5 maps the notifications defined in 3GPP TS 32.362 [7] onto corresponding GDMO notification defined in ITU-T Recommendation X.721 [9]. The operations are qualified either as Mandatory (M) or Optional (O).

Table 5: Mapping of notifications of the Kernel Configuration Management IRP: IS

Interface	Operation	GDMO Notification or CMISE of CMIP SS	Qualifier
KernelCmNotifications#1	notifyObjectCreation	objectCreation ITU-T X.721 [9] {smi2Notification 6}	O
KernelCmNotifications#2	notifyObjectDeletion	objectDeletion ITU-T X.721 [9] {smi2Notification 7}	O
KernelCmNotifications#3	notifyAttributeValueChange	attributeValueChange ITU-T X.721 [9] {smi2Notification 1}	O
KernelCmNotifications#4	notifyCMSynchronizationRecommended	notifyCMSynchronizationRecommended	O

4.2.3.1 Mapping of Notification Parameters

The tables 6, 7, 8 and 9 in the following subclauses list the parameters of each notification defined in the Kernel Configuration Management IRP: Information Service [7] and their equivalents in the CMIP Solution Set.

4.2.3.1.1 Parameter Mapping of the Notification *notifyObjectCreation*

Except for *objectClass*, *objectInstance*, *eventTime* and *notificationType* all parameters defined in the IS are mapped to the M-EVENT-REPORT parameter 'Event information'. The syntax of this structured parameter is defined for the notification *objectCreation* in ITU-T X.721 [9] by the ASN.1 definition *ObjectInfo*.

Table 6: Parameter mapping of the notification *notifyObjectCreation*

IS Parameter	CMIP SS Equivalent	Qualifier
objectClass	M-EVENT-REPORT Req/Ind parameter 'Managed object class'	M
objectInstance	M-EVENT-REPORT Req/Ind parameter 'Managed object instance'	M
notificationId	M-EVENT-REPORT Req/Ind parameter 'Event information' (ObjectInfo): notificationIdentifier	M
eventTime	M-EVENT-REPORT Req/Ind parameter 'Event time'	M
systemDN	This IS parameter is conditional and not used in the CMIP SS.	-
notificationType	M-EVENT-REPORT Req/Ind parameter 'Event type'	M
correlatedNotifications	M-EVENT-REPORT Req/Ind parameter 'Event information' (ObjectInfo): correlatedNotifications	O
sourceIndicator	M-EVENT-REPORT Req/Ind parameter 'Event information' (ObjectInfo): sourceIndicator	O
attributeList	M-EVENT-REPORT Req/Ind parameter 'Event information' (ObjectInfo): attributeList	O
additionalText	M-EVENT-REPORT Req/Ind parameter 'Event information' (ObjectInfo): additionalText	O
no equivalence	M-EVENT-REPORT Req/Ind parameter 'Event information' (ObjectInfo): additionalInformation	O

4.2.3.1.2 Parameters mapping of the notification *notifyObjectDeletion*

Except for *objectClass*, *objectInstance*, *eventTime* and *notificationType* all parameters defined in the IS are mapped to the M-EVENT-REPORT parameter 'Event information'. The syntax of this structured parameter is defined for the notification *objectDeletion* in ITU-T X.721 [9] by the ASN.1 definition *ObjectInfo*.

Table 7: Parameter mapping of the notification *notifyObjectDeletion*

IS Parameter	CMIP SS Equivalent	Qualifier
objectClass	M-EVENT-REPORT Req/Ind parameter 'Managed Object Class'	M
objectInstance	M-EVENT-REPORT Req/Ind parameter 'Managed object instance'	M
notificationId	M-EVENT-REPORT Req/Ind parameter 'Event information' (ObjectInfo): notificationIdentifier	M
eventTime	M-EVENT-REPORT Req/Ind parameter 'Event time'	M
systemDN	This IS parameter is conditional and not used in the CMIP SS.	-
notificationType	M-EVENT-REPORT Req/Ind parameter 'Event type'	M
correlatedNotifications	M-EVENT-REPORT Req/Ind parameter 'Event information' (ObjectInfo): correlatedNotifications	O
sourceIndicator	M-EVENT-REPORT Req/Ind parameter 'Event information' (ObjectInfo): sourceIndicator	O
attributeList	M-EVENT-REPORT Req/Ind parameter 'Event information' (ObjectInfo): attributeList	O
additionalText	M-EVENT-REPORT Req/Ind parameter 'Event information' (ObjectInfo): additionalText	O
no equivalence	M-EVENT-REPORT Req/Ind parameter 'Event information' (ObjectInfo): additionalInformation	O

4.2.3.1.3 Parameter mapping of the notification *notifyAttributeValueChange*

Except for *objectClass*, *objectInstance*, *eventTime* and *notificationType* all parameters defined in the IS are mapped to the M-EVENT-REPORT parameter 'Event information'. The syntax of this structured parameter is defined for the notification *attributeValueChange* in ITU-T X.721 [9] by the ASN.1 definition *AttributeValueChangeInfo*.

Table 8: Parameter mapping of the notification *notifyAttributeValueChange*

IS Parameter	CMIP SS Equivalent	Qualifier
objectClass	M-EVENT-REPORT Req/Ind parameter 'Managed Object Class'	M
objectInstance	M-EVENT-REPORT Req/Ind parameter 'Managed object instance'	M
notificationId	M-EVENT-REPORT Req/Ind parameter 'Event information' (AttributeValueChangeInfo): notificationIdentifier	M
eventTime	M-EVENT-REPORT Req/Ind parameter 'Event time'	M
systemDN	This IS parameter is conditional and not used in the CMIP SS	-
notificationType	M-EVENT-REPORT Req/Ind parameter 'Event type'	M
correlatedNotifications	M-EVENT-REPORT Req/Ind parameter 'Event information' (AttributeValueChangeInfo): correlatedNotifications	O
sourceIndicator	M-EVENT-REPORT Req/Ind parameter 'Event information' (AttributeValueChangeInfo): sourceIndicator	O
attributeValueChange	M-EVENT-REPORT Req/Ind parameter 'Event information' (AttributeValueChangeInfo): attributeValueChangeDefinition	M
no equivalence	M-EVENT-REPORT Req/Ind parameter 'Event information' (AttributeValueChangeInfo): attributeIdentifierList	O
additionalText	M-EVENT-REPORT Req/Ind parameter 'Event information' (AttributeValueChangeInfo): additionalText	O
no equivalence	M-EVENT-REPORT Req/Ind parameter 'Event information' (AttributeValueChangeInfo): additionalInformation	O

4.2.3.1.4 Parameter mapping of the notification *notifyCMSynchronizationRecommended*

Table 9: Parameter mapping of the notification *notifyCMSynchronizationRecommended*

IS Parameter Name	CMIP SS Equivalent	Qualifier
objectClass	M-EVENT-REPORT Req/Ind parameter 'Managed Object Class'	M
objectInstance	M-EVENT-REPORT Req/Ind parameter 'Managed object instance'	M
notificationId	M-EVENT-REPORT Req/Ind parameter 'Event information' (notifyCMSynchronizationRecommendedInfo): notificationIdentifier	M
eventTime	M-EVENT-REPORT Req/Ind parameter 'Event time':	M
systemDN	This IS parameter is conditional and not used in the CMIP SS	-
notificationType	M-EVENT-REPORT Req/Ind parameter (notifyCMSynchronizationRecommendedInfo): 'Event type'	M
baseMOClass	M-EVENT-REPORT Req/Ind parameter (notifyCMSynchronizationRecommendedInfo): baseMOC	M
baseMOInstance	M-EVENT-REPORT Req/Ind parameter (notifyCMSynchronizationRecommendedInfo): baseMOI	M
scope	M-EVENT-REPORT Req/Ind parameter (notifyCMSynchronizationRecommendedInfo): scope	M
additionalText	M-EVENT-REPORT Req/Ind parameter 'Event information' (notifyCMSynchronizationRecommendedInfo): additionalText	O

End of Change in Clause 4.2.3

Change in Clause 5

5 GDMO Definitions

5.1 Managed Object Classes

5.1.1 kernelCmIRP

kernelCmIRP **MANAGED OBJECT CLASS**

DERIVED FROM

"Rec. X.721 | ISO/IEC 10165-2 : 1992":top;

CHARACTERIZED BY

kernelCmIRPIdPackage,
kernelCmIRPVersionPackage,
kernelCmNRMIRPVersionPackage;

CONDITIONAL PACKAGES

kernelCmIRPProfilePackage **PRESENT IF** "an instance supports it",
kernelCmIRPSynchronizationPackage **PRESENT IF** "an instance supports it";

REGISTERED AS { ts32-664ObjectClass 1};

5.2 Packages

5.2.1 kernelCmIRPIdPackage

kernelCmIRPIdPackage **PACKAGE**

BEHAVIOUR

kernelCmIRPIdPackageBehaviour;

ATTRIBUTES

kernelCmIRPId;

REGISTERED AS { ts32-664Package 1};

kernelCmIRPIdPackageBehaviour **BEHAVIOUR**

DEFINED AS

"An instance of the MOC *kernelCmIRP* is identified by the value of the attribute *kernelCmIRPId*.";

5.2.2 kernelCmIRPVersionPackage

kernelCmIRPVersionPackage **PACKAGE**

BEHAVIOUR

kernelCmIRPVersionPackageBehaviour;

ATTRIBUTES

supportedKernelCmIRPVersions GET;

ACTIONS

getKernelCmIRPVersion;

REGISTERED AS { ts32-664Package 2};

kernelCmIRPVersionPackageBehaviour **BEHAVIOUR**

DEFINED AS

"This package has been defined to allow the IRPManager to get information about the Kernel Configuration Management IRP versions supported by the IRPAgent.

The attribute *supportedKernelCmIRPVersions* indicates all versions of the Kernel Configuration Management IRP currently supported by the IRPAgent.

The action *getKernelCmIRPVersion* is invoked by the IRPManager to get information about the Kernel Configuration Management IRP versions supported by the IRPAgent.";

5.2.3 kernelCmNRMIRPVersionPackage

kernelCmNRMIRPVersionPackage **PACKAGE**

BEHAVIOUR

kernelCmNRMIRPVersionPackageBehaviour;

ATTRIBUTES

versionNumberList GET,
vSEVersionNumberList GET;

ACTIONS

getNRMIRPVersion;

REGISTERED AS { ts32-664Package 3};

kernelCmNRMIRPVersionPackageBehaviour **BEHAVIOUR**

DEFINED AS

"This package has been defined to allow the IRPmanager to get detailed information about the NRM SS versions supported by the IRPAgent.

The attribute *versionNumberList* contains a list of supported NRM SS IRP versions.

The attribute *vSEVersionNumberList* contains a list of vendor-specific extended capabilities and features (VSE) that are based on 3GPP published specifications. If an IRPAgent supports VSE, the *vSEVersionNumberList* shall contain identification of one or more documents published by the vendor and additionally the *versionNumberList* shall contain the IRPVersions indicating the 3GPP specifications on which the VSE is based. Otherwise, if an IRPAgent does not support VSE, the *vSEVersionNumberList* shall contain no information. The lists *versionNumberList* and *vSEVersionNumberList* shall not contain duplicates.

The action *kernelCmNRMIRPVersion* is invoked by the IRPManager to get detailed information about the NRM SS versions supported by the IRPAgent.";

5.2.4 kernelCmIRPPProfilePackage

kernelCmIRPPProfilePackage **PACKAGE**

BEHAVIOUR

kernelCmIRPPProfilePackageBehaviour;

ACTIONS

getKernelCmIRPOperationProfile,
getKernelCmIRPNotificationProfile;

REGISTERED AS { ts32-664Package 4};

kernelCmIRPPProfilePackageBehaviour **BEHAVIOUR**

DEFINED AS

"This package has been defined to allow the IRPManager to get detailed information about the profile of the Kernel Configuration Management IRP.

The action *getKernelCmIRPOperationProfile* is invoked by the IRPManager to get detailed information about the operations supported by the Kernel Configuration Management IRP.

The action *getKernelCmIRPNotificationProfile* is invoked by the IRPManager to get detailed information about the notifications supported by the Kernel Configuration Management IRP.";

5.2.5 kernelCmIRPSynchronizationPackage

kernelCmIRPSynchronizationPackage **PACKAGE**

BEHAVIOUR

kernelCmIRPSynchronizationPackageBehaviour;

NOTIFICATIONS

notifyCMSynchronizationRecommended;

REGISTERED AS { ts32-664Package 5};

kernelCmIRPSynchronizationPackageBehaviour **BEHAVIOUR**

DEFINED AS

"This package has been defined to allow the IRPAgent to notify the subscribed IRPManager that part of or the whole configuration information of the IRPAgent needs to be synchronized.

The notification *notifyCMSynchronizationRecommended* is emitted by the IRPAgent to specify the scope of managed network resources whose information needs to be synchronized.";

5.3 Actions

5.3.1 getKernelCmIRPVersion (M)

getKernelCmIRPVersion **ACTION**

BEHAVIOUR

getKernelCmIRPVersionBehaviour;

MODE

CONFIRMED;

WITH REPLY SYNTAX

TS32-664TypeModule.GetKernelCmIRPVersionReply;

REGISTERED AS { ts32-664Action 1};getKernelCmIRPVersionBehaviour **BEHAVIOUR****DEFINED AS**

"The IRPManager invokes this action to get information about the Kernel Configuration Management IRP versions supported by the Agent. The 'Action information' field contains no data. The 'Action reply' is composed of the following data:

- *versionNumbersList*
- *status*

The parameter *versionNumbersList* defines a list of Kernel Configuration Management IRP versions supported by the Agent. A list containing no element, i.e. a NULL list, means that the concerned Agent doesn't support any version of the Kernel Configuration Management IRP. The parameter *status* contains the results of the IRPManager action. Possible values: noError (0), error (the value indicates the reason of the error).";

5.3.2 getKernelCmIRPNotificationProfile (O)

getKernelCmIRPNotificationProfile **ACTION****BEHAVIOUR**

getKernelCmIRPNotificationProfileBehaviour;

MODE

CONFIRMED;

WITH INFORMATION SYNTAX

TS32-664TypeModule.IRPVersionNumber;

WITH REPLY SYNTAX

TS32-664TypeModule.GetKernelCmIRPNotificationProfileReply;

REGISTERED AS { ts32-664Action 2};getKernelCmIRPNotificationProfileBehaviour **BEHAVIOUR****DEFINED AS**

"A IRPManager invokes this action to enquiry about the notification profile (supported notifications and supported parameters) for this specific Kernel Configuration Management IRP version.

The 'Action information' contains the following data:

- *irpVersionNumber*

This mandatory parameter identifies the Kernel Configuration Management IRP version.

The 'Action reply' is composed of the following data:

- *notificationNameProfile*
- *notificationParameterProfile*
- *status*

The parameter *notificationNameProfile* contains a list of notification names, i.e. a NULL list means that the Kernel Configuration Management IRP doesn't support any notification. The parameter *notificationParameterProfile* contains a set of elements, each element corresponds to a notification name and is composed by a set of parameter names. The parameter *status* contains the results of this action. Possible values: noError (0), error (the value indicates the reason of the error).";

5.3.3 getKernelCmIRPOperationProfile (O)

getKernelCmIRPOperationProfile **ACTION****BEHAVIOUR**

getKernelCmIRPOperationProfileBehaviour;

MODE

CONFIRMED;

WITH INFORMATION SYNTAX

TS32-664TypeModule.IRPVersionNumber;

WITH REPLY SYNTAX

TS32-664TypeModule.GetKernelCmIRPOperationProfileReply;

REGISTERED AS { ts32-664Action 3};getKernelCmIRPOperationProfileBehaviour **BEHAVIOUR**

DEFINED AS

"A IRPManager invokes this action to enquiry about the operation profile (supported operations and supported parameters) for this specific Kernel Configuration Management IRP version.

The 'Action information' contains the following data:

- *irpVersionNumber*

This mandatory parameter identifies the Kernel Configuration Management IRP version.

The 'Action reply' is composed of the following data:

- *operationNameProfile*
- *operationParameterProfile*
- *status*

The parameter *operationNameProfile* contains a list of operation names. The parameter *operationParameterProfile* contains a set of elements, each element corresponds to an operation name and is composed by a set of parameter names. The parameter *status* contains the results of this action. Possible values: noError (0), error (the value indicates the reason of the error).";

5.3.4 getNRMIRPVersion (O)

getNRMIRPVersion **ACTION**

BEHAVIOUR

getNRMIRPVersionBehaviour;

MODE

CONFIRMED;

WITH REPLY SYNTAX

TS32-664TypeModule.GetNRMIRPVersionReply;

REGISTERED AS { ts32-664Action 4};

getNRMIRPVersionBehaviour **BEHAVIOUR**

DEFINED AS

"The IRPManager invokes this action to get information about the NRM SS versions supported by the IRPAgent. The 'Action information' field contains no data. The 'Action reply' is composed of the following data:

- *versionNumbersList*
- *vSEVersionNumberList*
- *status*

The parameter *versionNumbersList* defines a list of NRM SS versions supported by an IRPAgent. If the IRPAgent supports the vendor-specific extended capabilities and features (VSE), the parameter *vSEVersionNumberList* contains identification of one or more documents published by the vendor. Otherwise if the IRPAgent does not support VSE, the parameter shall not contain any information. The parameter *status* contains the results of the IRPManager action. Possible values: Operation succeeded (0), operation failed (1).";

5.4 Attributes

5.4.1 kernelCmIRPIId

kernelCmIRPIId **ATTRIBUTE**

WITH ATTRIBUTE SYNTAX

TS32-664TypeModule.GeneralObjectId;

MATCHES FOR EQUALITY;

BEHAVIOUR

kernelCmIRPIIdBehaviour;

REGISTERED AS { ts32-664Attribute 1};

kernelCmIRPIIdBehaviour **BEHAVIOUR**

DEFINED AS

"This attribute names an instance of the MOC *kernelCmIRP*.";

5.4.2 supportedKernelCmIRPVersions

supportedKernelCmIRPVersions **ATTRIBUTE**

WITH ATTRIBUTE SYNTAX

TS32-664TypeModule.SupportedKernelCmIRPVersions;
MATCHES FOR EQUALITY;
BEHAVIOUR
 supportedKernelCmIRPVersionsBehaviour;
REGISTERED AS { ts32-664Attribute 2};

supportedKernelCmIRPVersionsBehaviour **BEHAVIOUR**
DEFINED AS
 "This attribute provides the information concerning the Kernel Configuration Management IRP versions currently supported by the Agent.";

5.4.3 versionNumberList

versionNumberList **ATTRIBUTE**
WITH ATTRIBUTE SYNTAX
 TS32-664TypeModule.VersionNumberList;
MATCHES FOR EQUALITY;
BEHAVIOUR
 versionNumberListBehaviour;
REGISTERED AS { ts32-664Attribute 3};

versionNumberListBehaviour **BEHAVIOUR**
DEFINED AS
 "This attribute provides the information concerning the NRM SS versions currently supported by an IRPAgent.";

5.4.4 vSEVersionNumberList

vSEVersionNumberList **ATTRIBUTE**
WITH ATTRIBUTE SYNTAX
 TS32-664TypeModule.VSEVersionNumberList;
MATCHES FOR EQUALITY;
BEHAVIOUR
 vSEVersionNumberListBehaviour;
REGISTERED AS { ts32-664Attribute 4};

vSEVersionNumberListBehaviour **BEHAVIOUR**
DEFINED AS
 "This attribute provides the information regarding identification of one or more documents published by the vendor and currently supported by an IRPAgent.";

5.5 Parameters

none

5.6 Notifications

5.6.1 notifyCMSynchronizationRecommended(O)

notifyCMSynchronizationRecommended **NOTIFICATION**
BEHAVIOUR
 notifyCMSynchronizationRecommendedBehaviour;
WITH INFORMATION SYNTAX
 TS32-664TypeModule.ObjectsSelection;
REGISTERED AS { ts32-664Notification 1};

notifyCMSynchronizationRecommendedBehaviour **BEHAVIOUR**
DEFINED AS
 "This notification type is used to notify IRPManager that part or whole of the CM information needs to be synchronized. In this notification, IRPAgent may specify the objects that are to be synchronized. For example, when a new managed element which contains a lot of MOIs is added, IRPAgent may just send this notification specifying the root object of a subtree in the MIT, and NMC may then trigger an operation to get the requested CM information";

End of Change in Clause 5

Change in Clause 6

6 ASN.1 Definitions

```
TS32-664TypeModule {itu-t(0) identified-organization(4) etsi(0) mobileDomain(0) umts-Operation-
Maintenance(3) ts32-664(664) informationModel(0) asn1Module(2) version1(1)}
```

```
DEFINITIONS IMPLICIT TAGS ::=
BEGIN
```

```
--EXPORTS everything
IMPORTS
```

```
-- from ITU-T X.721
AdditionalText
```

```
FROM Attribute-ASN1Module {joint-iso-ccitt ms(9) smi(3) part2(2) asn1Module (2) 1}
-- from ITU-T X.711
ObjectInstance, ObjectClass, Scope
```

```
FROM CMIP-1 { joint-iso-ccitt ms(9) cmip(1) modules(0) protocol(3) };
```

```
-- 3GPP TS 32.664 related Object Identifiers
```

```
baseNodeUMTS OBJECT IDENTIFIER ::= { itu-t (0) identified-organization (4) etsi (0)
mobileDomain (0) umts-Operation-Maintenance (3)}
```

```
ts32-664Prefix OBJECT IDENTIFIER ::= {baseNodeUMTS ts32-664 (664)}
ts32-664InfoModel OBJECT IDENTIFIER ::= {ts32-664Prefix informationModel (0)}
ts32-664ObjectClass OBJECT IDENTIFIER ::= {ts32-664InfoModel managedObjectClass (3)}
ts32-664Package OBJECT IDENTIFIER ::= {ts32-664InfoModel package (4)}
ts32-664Parameter OBJECT IDENTIFIER ::= {ts32-664InfoModel parameter (5)}
ts32-664Attribute OBJECT IDENTIFIER ::= {ts32-664InfoModel attribute (7)}
ts32-664Action OBJECT IDENTIFIER ::= {ts32-664InfoModel action (9)}
ts32-664Notification OBJECT IDENTIFIER ::= {ts32-664InfoModel notification (10)}
```

```
ErrorCauses ::= ENUMERATED
```

```
{
noError (0), -- operation / notification successfully performed
unspecifiedErrorReason (255) -- operation failed, specific error unknown
}
```

```
GetKernelCmIRPVersionReply ::= SEQUENCE
```

```
{
versionNumberList SupportedKernelCmIRPVersions,
status ErrorCauses
}
```

```
GetKernelCmIRPNotificationProfileReply ::= SEQUENCE
```

```
{
notificationNameProfile NotificationList,
notificationParameterProfile ParameterListOfList,
status ErrorCauses
}
```

```
GetKernelCmIRPOperationProfileReply ::= SEQUENCE
```

```
{
operationNameProfile OperationList,
operationParameterProfile ParameterListOfList,
status ErrorCauses
}
```

```
GetNRMIRPVersionReply ::= SEQUENCE
```

```
{
versionNumberList SupportedNRMSSVersions,
vSEVersionNumberList SupportedVSEVersions,
status ErrorCauses
}
```

```
GeneralObjectId ::= INTEGER
```

```
IRPVersionNumber ::= GraphicString
```

```
SupportedKernelCmIRPVersions ::= SET OF IRPVersionNumber
```

```
SupportedNRMSSVersions ::= SET OF IRPVersionNumber
SupportedVSEVersions ::= SET OF IRPVersionNumber
NotificationList ::= SET OF NotificationName
NotificationName ::= GraphicString
OperationList ::= SET OF OperationName
OperationName ::= GraphicString
ParameterListOfList ::= SET OF ParameterList
ParameterList ::= SET OF ParameterName
ParameterName ::= GraphicString
VersionNumberList ::= SupportedKernelCmIRPVersions
VSEVersionNumberList ::= SupportedVSEVersions
ObjectsSelection ::= SEQUENCE
{
    baseMOC          ObjectClass,
    baseMOI          ObjectInstance,
    scope            Scope,
    additionalText  AdditionalText OPTIONAL
}
END -- of module TS32-664TypeModule
```

End of Change in Clause 6

Annex A (informative): Change history

Change history							
Date	TSG #	TSG Doc.	CR	Rev	Subject/Comment	Old	New
Sep 2002	S_17	SP-020467	--	--	Submitted to TSG SA #17 for Information	1.0.0	
Dec 2002	S_18	SP-020743	--	--	Submitted to TSG SA #18 for Approval	2.0.0	5.0.0

CHANGE REQUEST

⌘ **32.663 CR 002** ⌘ rev **-** ⌘ Current version: **5.0.0** ⌘

For **HELP** on using this form, see bottom of this page or look at the pop-up text over the ⌘ symbols.

Proposed change affects: UICC apps ME Radio Access Network Core Network

Title:	⌘ Add IDL definition of notifyCMSynchronizationRecommended notification for KernelCM IRP		
Source:	⌘ S5		
Work item code:	⌘ OAM-NIM Date: ⌘ 28/02/2003		
Category:	<table style="width: 100%; border: none;"> <tr> <td style="width: 50%; vertical-align: top;"> ⌘ B Use <u>one</u> of the following categories: F (correction) A (corresponds to a correction in an earlier release) B (addition of feature), C (functional modification of feature) D (editorial modification) Detailed explanations of the above categories can be found in 3GPP TR 21.900. </td> <td style="width: 50%; vertical-align: top;"> Release: ⌘ Rel-6 Use <u>one</u> of the following releases: 2 (GSM Phase 2) R96 (Release 1996) R97 (Release 1997) R98 (Release 1998) R99 (Release 1999) Rel-4 (Release 4) Rel-5 (Release 5) Rel-6 (Release 6) </td> </tr> </table>	⌘ B Use <u>one</u> of the following categories: F (correction) A (corresponds to a correction in an earlier release) B (addition of feature), C (functional modification of feature) D (editorial modification) Detailed explanations of the above categories can be found in 3GPP TR 21.900 .	Release: ⌘ Rel-6 Use <u>one</u> of the following releases: 2 (GSM Phase 2) R96 (Release 1996) R97 (Release 1997) R98 (Release 1998) R99 (Release 1999) Rel-4 (Release 4) Rel-5 (Release 5) Rel-6 (Release 6)
⌘ B Use <u>one</u> of the following categories: F (correction) A (corresponds to a correction in an earlier release) B (addition of feature), C (functional modification of feature) D (editorial modification) Detailed explanations of the above categories can be found in 3GPP TR 21.900 .	Release: ⌘ Rel-6 Use <u>one</u> of the following releases: 2 (GSM Phase 2) R96 (Release 1996) R97 (Release 1997) R98 (Release 1998) R99 (Release 1999) Rel-4 (Release 4) Rel-5 (Release 5) Rel-6 (Release 6)		

Reason for change:	⌘ The KernelCM IRP lacks the notification which informs NM that great deal of changed configuration information in the managed system needs to be synchronized.
Summary of change:	⌘ Add the IDL definition of notifyCMSynchronizationRecommended notification.
Consequences if not approved:	⌘ If there are large changes generated in the network, it is inefficient to send lots of notifications such as "notifyObjectCreation", "notifyObjectDeletion" or "notifyObjectAttributeValueChange" to IRPManager through Itf-N.

Clauses affected:	⌘ 6.2, 6.4, 7, Annex B										
Other specs affected:	<table border="1" style="border-collapse: collapse;"> <tr> <td style="padding: 2px;">Y</td> <td style="padding: 2px;">N</td> </tr> <tr> <td style="padding: 2px;"><input checked="" type="checkbox"/></td> <td style="padding: 2px;"><input checked="" type="checkbox"/></td> </tr> <tr> <td style="padding: 2px;"><input checked="" type="checkbox"/></td> <td style="padding: 2px;"><input checked="" type="checkbox"/></td> </tr> <tr> <td style="padding: 2px;"><input checked="" type="checkbox"/></td> <td style="padding: 2px;"><input checked="" type="checkbox"/></td> </tr> </table>	Y	N	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Other core specifications Test specifications O&M Specifications	⌘
Y	N										
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>										
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>										
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>										
Other comments:	⌘ This is a Child CR of 32662CR001 S5-027032 Alignment of CMCC/SA5 CM framework										

How to create CRs using this form:

Comprehensive information and tips about how to create CRs can be found at <http://www.3gpp.org/specs/CR.htm>. Below is a brief summary:

- 1) Fill out the above form. The symbols above marked ⌘ contain pop-up help information about the field that they are closest to.
- 2) Obtain the latest version for the release of the specification to which the change is proposed. Use the MS Word "revision marks" feature (also known as "track changes") when making the changes. All 3GPP specifications can be downloaded from the 3GPP server under <ftp://ftp.3gpp.org/specs/> For the latest version, look for the directory name with the latest date e.g. 2001-03 contains the specifications resulting from the March 2001 TSG meetings.

- 3) With "track changes" disabled, paste the entire CR form (use CTRL-A to select it) into the specification just in front of the clause containing the first piece of changed text. Delete those parts of the specification which are not relevant to the change request.

6 Mapping

6.1 General mappings

The IS parameter name `managedObjectInstance` is mapped into DN.

Attributes modelling associations as defined in the NRM (here also called "reference attributes") are in this SS mapped to attributes. The names of the reference attributes in the NRM are mapped to the corresponding attribute names in the MOC. When the cardinality for an association is 0..1 or 1..1 the datatype for the reference attribute is defined as an `MOReference`. The value of an MO reference contains the distinguished name of the associated MO. When the cardinality for an association allows more than one referred MO, the reference attribute will be of type `MOReferenceSet`, which contains a sequence of MO references.

If a reference attribute is changed, an `AttributeValueChange` notification is emitted.

Change in Clause 6.2

6.2 Operation and Notification mapping

The Kernel CM IRP: IS (see 3GPP TS 32.662 [4]) defines semantics of operation and notification visible across the Kernel Configuration Management IRP. Table 1 indicates mapping of these operations and notifications to their equivalents defined in this SS.

Table 1: Mapping from IS Notification/Operation to SS equivalents

IS Operation/ notification (3GPP TS 32.662 [4])	SS Method	Qualifier
<code>getNRMIRPVersion</code>	<code>get_NRM_IRP_version</code>	M
<code>notifyObjectCreation</code>	See Notification IRP: CORBA SS [9]	O
<code>notifyObjectDeletion</code>	See Notification IRP: CORBA SS [9]	O
<code>notifyAttributeValueChange</code>	See Notification IRP: CORBA SS [9]	O
<code>getIRPVersion</code>	<code>get_kernel_CM_IRP_versions</code>	M
<code>getOperationProfile</code>	<code>get_kernel_CM_IRP_operation_profile</code>	O
<code>getNotificationProfile</code>	<code>get_kernel_CM_IRP_notification_profile</code>	O
<code>notifyCMSynchronizationRecommended</code>	See Notification IRP: CORBA SS [9]	O

End of Change in Clause 6.2

6.3 Operation parameter mapping

The Kernel CM IRP: IS (see 3GPP TS 32.662 [4]) defines semantics of parameters carried in operations across the Kernel Configuration Management IRP. Table 2 indicates the mapping of these parameters, as per operation, to their equivalents defined in this SS.

Table 2a: Mapping from IS `getNRMIRPVersion` parameters to SS equivalents

IS Operation parameter	SS Method parameter	Qualifier
<code>versionNumberList</code>	Return value of type <code>ManagedGenericIRPConstDefs::VersionNumberSet</code>	M
<code>vSEVersionNumberList</code>	Return value of type <code>ManagedGenericIRPConstDefs::VersionNumberSet</code>	M
<code>status</code>	Exceptions: <code>GetNRMIRPVersion</code>	M

Table 2b: Mapping from IS getKernelCmIRPVersion parameters to SS equivalents

IS Operation parameter	SS Method parameter	Qualifier
versionNumberList	return of type ManagedGenericIRPConstDefs::VersionNumberSet	M
status	exception GetKernelCmIRPVersionsException	M

Table 3: Mapping from IS getOperationProfile parameters to SS equivalents

IS Operation parameter	SS Method parameter	Qualifier
IrpVersion	ManagedGenericIRPConstDefs::VersionNumber kernel_CM_IRP_version	M
operationNameProfile, operationParameterProfile	Return value of type ManagedGenericIRPConstDefs::MethodList	M
Status	Exceptions: GetKernelCMIRPOperationProfileException, ManagedGenericIRPSystem::OperationNotSupported, ManagedGenericIRPSystem::InvalidParameter	M

Table 4: Mapping from IS getNotificationProfile parameters to SS equivalents

IS Operation parameter	SS Method parameter	Qualifier
IrpVersion	ManagedGenericIRPConstDefs::VersionNumber kernel_CM_IRP_version	M
notificationNameProfile, notificationParameterProfile	Return value of type ManagedGenericIRPConstDefs::MethodList	M
Status	Exceptions: GetKernelCMIRPNotificationProfileException, ManagedGenericIRPSystem::OperationNotSupported, ManagedGenericIRPSystem::InvalidParameter	M

Change in Clause 6.4

6.4 Notification attribute mapping

The Kernel CM IRP: IS (see 3GPP TS 32.662 [4]) identifies and defines the semantics of attributes for notifyObjectCreation, notifyObjectDeletion, notifyAttributeValueChange and notifyCMSynchronizationRecommended for use for its IRP. Table 3 shows the mapping of the IS notifications to SS equivalents.

Table 5: Mapping from IS notifications to SS equivalents

IS notifications in 3GPP TS 32.662 [4]	SS notifications	Qualifier
NotifyObjectCreation	push_structured_event	O
NotifyObjectDeletion	push_structured_event	O
NotifyAttributeValue Change	push_structured_event	O
NotifyCMSynchronizationRecommended	push_structured_event	M

The Kernel CM IRP: IS (see 3GPP TS 32.662 [4]) also qualifies the attributes. Tables 4,5, 6 and 7 show the mapping of these IS attributes to SS equivalents.

Table 6: Mapping from IS Notification Header attributes to SS equivalent

IS Attribute of Notification Header in 3GPP TS 32.662 [4]	SS Attribute	Qualifier
managedObjectClass	KernelCmNotifDefs::NotificationCommon::MANAGED_OBJECT_CLASS	M
managedObjectInstance	KernelCmNotifDefs::NotificationCommon::MANAGED_OBJECT_INSTANCE	M
notificationId	KernelCmNotifDefs::NotificationCommon::NOTIFICATION_ID	O
eventTime	KernelCmNotifDefs::NotificationCommon::EVENT_TIME	M
systemDN	KernelCmNotifDefs::NotificationCommon::SYSTEM_DN	O
eventType	header.fixed_header.event_type.type_name	M

Table 7: Mapping from IS notifyObjectCreation attributes to SS equivalent OBJECT_CREATION

IS Attribute of notifyObjectCreation in 3GPP TS 32.662 [4]	SS Attribute	Qualifier
notificationHeader	See table 6	M
correlatedNotifications	KernelCmNotifDefs::MOCreation::CORRELATED_NOTIFICATIONS	O
additionalText	KernelCmNotifDefs::MOCreation::ADDITIONAL_TEXT	O
sourceIndicator	KernelCmNotifDefs::MOCreation::SOURCE_INDICATOR	O
attributeList	KernelCMNotifDefs::MOCreation::MOAttributeSet (contained in remainder_of_body)	O

Table 8: Mapping from IS notifyObjectDeletion attributes to SS equivalent OBJECT_DELETION

IS Attribute of notifyObjectDeletion in 3GPP TS 32.662 [4]	SS Attribute	Qualifier
notificationHeader	See table 6	M
correlatedNotifications	KernelCmNotifDefs::MODeletion::CORRELATED_NOTIFICATIONS	O
additionalText	KernelCmNotifDefs::MODeletion::ADDITIONAL_TEXT	O
sourceIndicator	KernelCmNotifDefs::MODeletion::SOURCE_INDICATOR	O
attributeList	KernelCMNotifDefs::MODeletion::MOAttributeSet (contained in remainder_of_body)	O

Table 9: Mapping from IS notifyAttributeValueChange attributes to SS equivalent ATTRIBUTE_VALUE_CHANGE

IS Attribute of notifyAttributeValueChange in 3GPP TS 32.662 [4]	SS Attribute	Qualifier
notificationHeader	See table 6	M
correlatedNotifications	KernelCmNotifDefs::AttributeValueChange::CORRELATED_NOTIFICATIONS	O
additionalText	KernelCmNotifDefs::AttributeValueChange::ADDITIONAL_TEXT	M
sourceIndicator	KernelCmNotifDefs::AttributeValueChange::SOURCE_INDICATOR	O
attributeValueChangeDefinition	KernelCMNotifDefs::AttributeValueChange::MOAttributeSet (contained in remainder_of_body)	M

Table 10: Mapping from IS notifyCMSynchronizationRecommended attributes to SS equivalent REQUEST_CM_SYNCHRONIZATION

IS Attribute of notifyCMSynchronizationRecommended in 3GPP TS 32.662 [4]	SS Attribute	Qualifier
notificationHeader	See table 6	M
aseMOClass	KernelCmNotifDefs::CMSynchronizationRecommended::BASE_MO_CLASS	M
aseMOInstance	KernelCmNotifDefs::CMSynchronizationRecommended::BASE_MO_INSTANCE	M
scope	KernelCmNotifDefs::CMSynchronizationRecommended::SCOPE	M
additionalText	KernelCmNotifDefs::CMSynchronizationRecommended::ADDITIONAL_TEXT	O

End of Change in Clause 6.4

Change in Clause 7

7 Use of OMG Structured Event

In CORBA SS, OMG defined `StructuredEvent` (see OMG Notification Service [6]) is used to carry notifications. This clause identifies the OMG defined `StructuredEvent` attributes that carry the attributes of notifications defined in 3GPP TS 32.662 [4].

The composition of OMG Structured Event, as defined in OMG Notification Service [6], is:

```
Header
  Fixed Header
    domain_name
    type_name
    event_name
  Variable Header
Body
  filterable_body_fields
  remainder_of_body
```

Table 8 lists all OMG Structured Event attributes in its leftmost column. The second column identifies the SS attributes, if any, that shall be carried there.

Attributes that are denoted as "optional" may be absent from the OMG Structured Event. As an example, if the optional `additionalText` attribute is not used for a particular notification, then the IRPAgent may exclude `additionalText` from the filterable body fields for that particular notification. Individual notifications from the same IRPAgent may include or exclude the same optional attribute.

Table 11: Use of OMG Structured Event

SS Attribute	OMG CORBA Structured Event attribute	Comment
There is no corresponding SS attribute	domain_name	It contains the supported SS document version (see clause 4). This version is defined by the string constant KernelCmIRPSystem::VERSION defined in this specification.
Event Type	type_name	It is an attribute of notificationHeader. It shall indicate one of the following: Object Creation, Object Deletion, Attribute Value Change and CM Synchronization Recommended. It is a string. Its value is either defined by KernelCmNotifDefs::MOCreation::EVENT_TYPE, KernelCmNotifDefs::MODEletion::EVENT_TYPE, KernelCmNotifDefs::AttributeValueChange::EVENT_TYPE or KernelCmNotifDefs::CMSynchronizationRecommended::EVENT_TYPE
-	event_name	Shall be set to an empty string
There is no corresponding SS attribute	variable Header	
Managed Object Class, Managed Object Instance	One NV pair of filterable_body_fields	NV stands for name-value pair. Order arrangement of NV pairs is not significant. The name of NV-pair is always encoded in string. They are attributes of notificationHeader. Name of NV pair is a string, KernelCmNotifDefs::<interface>::MANAGED_OBJECT_INSTANCE where <interface> is either MOCreation, MODEletion, AttributeValueChange or CMSynchronizationRecommended. Value of NV pair is a string. This string conveys the semantics of both the Managed Object Class and the Managed Object Instance. See corresponding table in Notification IRP: CORBA SS (3GPP TS 32.303 [9]).
NotificationId	One NV pair of filterable_body_fields	It is an attribute of notificationHeader. Name of NV pair is a string, KernelCmNotifDefs::<interface>::NOTIFICATION_ID where <interface> is either MOCreation, MODEletion, AttributeValueChange or CMSynchronizationRecommended. Value of NV pair is a long. See corresponding table in Notification IRP: CORBA SS (3GPP TS 32.303 [9]).
EventTime	One NV pair of filterable_body_fields	It is an attribute of notificationHeader. Name of NV pair is a string, KernelCmNotifDefs::<interface>::EVENT_TIME where <interface> is either MOCreation, MODEletion, AttributeValueChange or CMSynchronizationRecommended. Value of NV pair is a ManagedGenericIRPConstDefs::IRPTime defined in 3GPP TS 32.303 [9]. See corresponding table in Notification IRP: CORBA SS (3GPP TS 32.303 [9]).
SystemDN	One NV pair of filterable_body_fields	It is an attribute of notificationHeader. Name of NV pair is a string, KernelCmNotifDefs::<interface>::SYSTEM_DN where <interface> is either MOCreation, MODEletion, AttributeValueChange or CMSynchronizationRecommended. Value of NV pair is a string. See corresponding table in Notification IRP: CORBA SS [9].
Correlated Notifications	One NV pair of filterable_body_fields	It is an attribute of the Object Creation, Object Deletion and Attribute Value Change notifications. Name of NV pair is a string, KernelCmNotifDefs::<interface>::CORRELATED_NOTIFICATIONS where <interface> is either MOCreation, MODEletion or AttributeValueChange. Value of NV pair is a NotificationIRPConstDefs::CorrelatedNotificationSetType defined in 3GPP TS 32.303 [9].
Additional Text	One NV pair of filterable_body_fields	It is an attribute of the Object Creation, Object Deletion, Attribute Value Change and CM Synchronization Recommended notifications. Name of NV pair is a string, KernelCmNotifDefs::<interface>::ADDITIONAL_TEXT where <interface> is either MOCreation, MODEletion, AttributeValueChange or CMSynchronizationRecommended. Value of NV pair is a string.

SS Attribute	OMG CORBA Structured Event attribute	Comment
Source Indicator	One NV pair of filterable_body_fields	It is an attribute of the Object Creation, Object Deletion and Attribute Value Change notifications. Name of NV pair is a string, KernelCmNotifDefs::<interface>::SOURCE_INDICATOR where <interface> is either MOCreation, MODeletion or AttributeValueChange. Value of NV pair is a string with values of either KernelCmNotifDefs::<interface>::RESOURCE_OPERATION, KernelCmNotifDefs::<interface>::MANAGEMENT_OPERATION or KernelCmNotifDefs::<interface>::UNKNOWN_OPERATION where <interface> is either MODeletion, MOCreation or AttributeValueChange.
There is no corresponding SS attribute		Is used to transport attribute information. For Object Creation notification, this is defined by KernelCmNotifDefs::MOCreation::InitialAttributeValues. For Object Deletion notification, this is defined by KernelCmNotifDefs::MODeletion::AttributeValues. For Attribute Value Change notification, this is defined by KernelCmNotifDefs::AttributeValueChange::ModifiedAttributeSet. The name component of InitialAttributeValues, AttributeValues and ModifiedAttributeSet will be set to attribute names defined in KernelCmNRMDefs.
Base MO Class	One NV pair of filterable_body_fields	It is an attribute of the CM Synchronization Recommended notifications. Name of NV pair is a string, KernelCmNotifDefs::CMSynchronizationRecommended::BASE_MO_CLASS. Value of NV pair is a string. This string conveys the semantics of the Managed Object Class.
Base MO Instance	One NV pair of filterable_body_fields	It is an attribute of the CM Synchronization Recommended notifications. Name of NV pair is a string, KernelCmNotifDefs::CMSynchronizationRecommended::BASE_MO_INSTANCE. Value of NV pair is a string. This is the DN string of the Managed Object Instance.
Scope	One NV pair of filterable_body_fields	It is an attribute of the CM Synchronization Recommended notifications. Name of NV pair is a string, KernelCmNotifDefs::CMSynchronizationRecommended::SCOPE. Value of NV pair is KernelCmNotifDefs::ScopePara.

End of Change in Clause 7

8 Rules for NRM extensions

This clause discusses how the models and IDL definitions provided in the present document can be extended for a particular implementation and still remain compliant with 3GPP SA5's specifications.

8.1 Allowed extensions

Vendor-specific MOCs may be supported. The vendor-specific MOCs may support new types of attributes. The 3GPP SA5-specified notifications may be issued referring to the vendor-specific MOCs and vendor-specific attributes. New MOCs shall be distinguishable from 3GPP SA5 MOCs by name. 3GPP SA5-specified and vendor-specific attributes may be used in vendor-specific MOCs. Vendor-specific attribute names shall be distinguishable from existing attribute names.

NRM MOCs may be subclassed. Subclassed MOCs shall maintain the specified behaviour of the 3GPP SA5's superior classes. They may add vendor-specific behaviour with vendor-specific attributes. When subclassing, naming attributes cannot be changed. The subclassed MOC shall support all attributes of its superior class. Vendor-specific attributes cannot be added to 3GPP SA5 NRM MOCs without subclassing.

When subclassing, the 3GPP SA5-specified containment rules and their specified cardinality shall still be followed. As an example, ManagementNode (or its subclasses) shall be contained under SubNetwork (or its subclasses). Also, in Rel-4, there may only be 0 or 1 ManagementNode (or its subclasses) contained under SubNetwork (or its subclasses).

Managed Object Instances may be instantiated as CORBA objects. This requires that the MOCs be represented in IDL. 3GPP SA5's NRM MOCs are not currently specified in IDL, but may be specified in IDL for instantiation or subclassing purposes. However, management information models should not require that IRPManagers access the

instantiated managed objects other than through supported methods in the present document.

Extension rules related to notifications (Notification categories, Event Types, Extended Event Types etc.) are for further study.

8.2 Extensions not allowed

The IDL specifications in the present document cannot be edited or altered. Any additional IDL specifications shall be specified in separate IDL files.

IDL interfaces (note: not MOCs) specified in the present document may not be subclassed or extended. New interfaces may be defined with vendor-specific methods.

Annex A (normative): CORBA IDL, Access Protocol

```

#ifndef KernelCmIRPSystem_idl
#define KernelCmIRPSystem_idl

#include "ManagedGenericIRPConstDefs.idl"

// This statement must appear after all include statements
#pragma prefix "3gppsa5.org"

module KernelCmIRPSystem
{

    /**
     * The KernelCmIrpOperations interface.
     * Supports a number of Resource Model versions.
     */
    interface KernelCmIrpOperations
    {

        /**
         * Get the version(s) of the interface
         *
         * @raises GetNRMIRPVersion when the system for some reason
         *   can not return the supported versions.
         * @returns all supported versions.
         */
        void get_NRM_IRP_version
        (
            out ManagedGenericIRPConstDefs::VersionNumberSet versionNumberList,
            out ManagedGenericIRPConstDefs::VersionNumberSet vSEVersionNumberList
        )
        raises (GetNRMIRPVersion);

        /**
         * Return the list of all supported operations and their supported
         * parameters for a specific KernelCM IRP version.
         */
        ManagedGenericIRPConstDefs::MethodList get_kernel_CM_IRP_operation_profile (
            in ManagedGenericIRPConstDefs::VersionNumber kernel_CM_IRP_version
        )
        raises (GetKernelCMIRPOperationProfileException,
            ManagedGenericIRPSystem::OperationNotSupported,
            ManagedGenericIRPSystem::InvalidParameter);

        /**
         * Return the list of all supported notifications and their supported
         * parameters for a specific KernelCM IRP version.
         */
        ManagedGenericIRPConstDefs::MethodList
        get_kernel_CM_IRP_notification_profile
        (
            in ManagedGenericIRPConstDefs::VersionNumber kernel_CM_IRP_version
        )
        raises (GetKernelCMIRPNotificationProfileException,
            ManagedGenericIRPSystem::OperationNotSupported,
            ManagedGenericIRPSystem::InvalidParameter);
    };
};
#endif

```

Change in Clause Annex B

Annex B (normative): CORBA IDL, Notification Definitions

```

#ifndef KernelCmNotifDefs_idl
#define KernelCmNotifDefs_idl

#include <TimeBase.idl>          // CORBA Time Service
#include <NotificationIRPConstDefs.idl>

// This statement must appear after all include statements
#pragma prefix "3gppsa5.org"

module KernelCmNotifDefs
{

    /**
     * Definition of ITU-T defined semantics.
     * These constants are used in the type_name
     * (header.fixed_header.event_type.type_name)
     * field to denote the notification type
     * Note all values are unique among themselves. Other IRP documents
     * cannot use the same values.
     */
    const string ET_OBJECT_CREATION = "x6";

    const string ET_OBJECT_DELETION = "x7";

    const string ET_ATTRIBUTE_VALUE_CHANGE = "x8";
    const string ET_CM_SYNCHRONIZATION_RECOMMENDED = "x9";

    /**
     * Information about one attribute
     * - name defines the name of the attribute
     * - value defines the value of the attribute
     */
    struct MOAttribute
    {
        string name;
        any value;
    };

    /**
     * A set of attribute names and values
     */
    typedef sequence<MOAttribute> MOAttributeSet;

    /**
     * ScopeType defines the kind of scope to use in a CM synchronization
     * request together with ScopePara.level, in the SCOPE field.
     *
     * ScopePara.level is always >= 0. If a level is bigger than the
     * depth of the tree there will be no exceptions thrown.
     * BASE_ONLY: level ignored, just return the base object.
     * BASE_NTH_LEVEL: return all subordinate objects that are on "level"
     * distance from the base object, where 0 is the base object.
     * BASE_SUBTREE: return the base object and all of its subordinates
     * down to and including the nth level.
     * BASE_ALL: level ignored, return the base object and all of it's
     * subordinates.
     */
    enum ScopeType

```

```

{
    BASE_ONLY,
    BASE_NTH_LEVEL,
    BASE_SUBTREE,
    BASE_ALL
};

struct ScopePara
{
    ScopeType type;
    unsigned long level;
};

/**
 * This interface defines fields that are common for all
 * notification types.
 * All constants in the scope of this interface will be
 * visible in the interfaces that inherits this.
 * For instance constant
 * NotificationCommon::MANAGED_OBJECT_CLASS
 * can be addressed by MODeletion::MANAGED_OBJECT_CLASS
 */
/*
 * This block identifies attributes which are included as part of the Kernel
 * CM IRP. These attribute values should not clash with those defined for the
 * attributes of notification header (see IDL of Notification IRP).
 */
interface AttributeNameValue
{
    const string SOURCE_INDICATOR = "SOURCE";
    const string ADDITIONAL_TEXT = "ADD_TEXT";
    const string CORRELATED_NOTIFICATIONS = "CORREL_NOTIFS";
    const string BASE_MO_CLASS = "BASE_MOC";
    const string BASE_MO_INSTANCE = "BASE_MOI";
    const string SCOPE = "SCOPE";
};

interface NotificationCommon
{
    /**
     * This constant defines a field in the filterable
     * information in a StructuredEvent.
     * This string is mapped to the name part of a
     * Property in the event and the value part will
     * carry the MO class name represented
     * as a string.
     */
    const string MANAGED_OBJECT_CLASS =
        NotificationIRPConstDefs::AttributeNameValue::MANAGED_OBJECT_CLASS;

    /**
     * This constant defines a field in the filterable
     * information in a StructuredEvent.
     * This string is mapped to the name part of a
     * Property in the event and the value part will
     * carry the MO distinguished name represented
     * as a string.
     */
    const string MANAGED_OBJECT_INSTANCE =
        NotificationIRPConstDefs::AttributeNameValue::MANAGED_OBJECT_INSTANCE;

    /**
     * This constant defines the name of the notification
     * ID property, which is transported in the
     * filterable_body_fields
     */
    const string NOTIFICATION_ID =
        NotificationIRPConstDefs::AttributeNameValue::NOTIFICATION_ID;

```

```

/**
 * This constant defines the name of the
 * event time property, which is transported in the
 * filterable_body_fields.
 * The data type for the value of this property
 * is defined by datatype CommonIRPConstDefs::IRPTime
 */
const string EVENT_TIME =
    NotificationIRPConstDefs::AttributeNameValue::EVENT_TIME;

/**
 * This constant defines the name of the
 * system name property, which is transported in the
 * filterable_body_fields
 */
const string SYSTEM_DN =
    NotificationIRPConstDefs::AttributeNameValue::SYSTEM_DN;

/**
 * This constant defines the name of the
 * source indicator property, which is transported in the
 * filterable_body_fields
 */
const string SOURCE_INDICATOR =
    KernelCmNotifDefs::AttributeNameValue::SOURCE_INDICATOR;

/**
 * Valid values for the SOURCE_INDICATOR
 * property
 */
const string RESOURCE_OPERATION = "RESOURCE OPERATION";
const string MANAGEMENT_OPERATION = "MANAGEMENT OPERATION";
const string UNKNOWN_OPERATION = "UNKNOWN";

/**
 * This constant defines the name of the
 * additional text property,
 * which is transported in the filterable_body
 * fields.
 * The data type for the value of this property
 * is a string.
 */
const string ADDITIONAL_TEXT =
    KernelCmNotifDefs::AttributeNameValue::ADDITIONAL_TEXT;

/**
 * This constant defines the name of the
 * correlated notifications property,
 * which is transported in the
 * filterable_body_fields
 * The value part of the property is defined
 * in the NotificationIRP;
 * NotificationIRPConstDefs::CorrelatedNotificationSetType
 */
const string CORRELATED_NOTIFICATIONS =
    KernelCmNotifDefs::AttributeNameValue::CORRELATED_NOTIFICATIONS;
};

/**
 * Constant definitions for the MO deleted notification
 */
interface MODeletion : NotificationCommon
{
    const string EVENT_TYPE = ET_OBJECT_DELETION;

```

```

/**
 * This information mapped into the remainder_of_body
 * in the StructuredEvent
 */
typedef MOAttributeSet AttributeValues;
};

/**
 * Constant definitions for the MO created notification
 */
interface MOCreation : NotificationCommon
{
    const string EVENT_TYPE = ET_OBJECT_CREATION;

    /**
     * This information mapped into the remainder_of_body
     * in the StructuredEvent
     */
    typedef MOAttributeSet InitialAttributeValues;
};

/**
 * Constant definitions for the Attribute Value Change
 * notification
 */
interface AttributeValueChange : NotificationCommon
{
    const string EVENT_TYPE = ET_ATTRIBUTE_VALUE_CHANGE;

    /**
     * Information about modified attributes for
     * one MO instance.
     * - name defines the name of the attribute
     * - newValue defines the new value of the attribute
     * - oldValue defines the previous value of the attribute
     * The value is optional, which means that it may contain
     * an empty any (null inserted in the any).
     */
    struct ModifiedAttribute
    {
        string name;
        any newValue;
        any oldValue;
    };

    /**
     * This information mapped into the remainder_of_body
     * in the StructuredEvent.
     */
    typedef sequence<ModifiedAttribute> ModifiedAttributeSet;
};

/**
 * Constant definitions for the CM Synchronization Recommended notification
 */
interface CMSynchronizationRecommended
{
    const string EVENT_TYPE = ET_CM_SYNCHRONIZATION_RECOMMENDED;

    /**
     * This constant defines a field in the filterable
     * information in a StructuredEvent.
     * This string is mapped to the name part of a
     * Property in the event and the value part will

```

```

* carry the MO class name represented
* as a string.
*/
const string MANAGED_OBJECT_CLASS =
  NotificationIRPCConstDefs::AttributeNameValue::MANAGED_OBJECT_CLASS;

/**
* This constant defines a field in the filterable
* information in a StructuredEvent.
* This string is mapped to the name part of a
* Property in the event and the value part will
* carry the MO distinguished name represented
* as a string.
*/
const string MANAGED_OBJECT_INSTANCE =
NotificationIRPCConstDefs::AttributeNameValue::MANAGED_OBJECT_INSTANCE;

/**
* This constant defines the name of the notification
* ID property, which is transported in the
* filterable_body_fields
*/
const string NOTIFICATION_ID =
  NotificationIRPCConstDefs::AttributeNameValue::NOTIFICATION_ID;

/**
* This constant defines the name of the
* event time property, which is transported in the
* filterable_body_fields.
* The data type for the value of this property
* is defined by datatype CommonIRPCConstDefs::IRPTime
*/
const string EVENT_TIME =
  NotificationIRPCConstDefs::AttributeNameValue::EVENT_TIME;

/**
* This constant defines the name of the
* system name property, which is transported in the
* filterable_body_fields
*/
const string SYSTEM_DN =
  NotificationIRPCConstDefs::AttributeNameValue::SYSTEM_DN;

/**
* This constant defines the name of the
* additional text property,
* which is transported in the filterable_body
* fields.
* The data type for the value of this property
* is a string.
*/
const string ADDITIONAL_TEXT =
  KernelCmNotifDefs::AttributeNameValue::ADDITIONAL_TEXT; /**

* This constant defines the name of the
* base MO class property,
* which is transported in the filterable_body
* fields.
* The value part of this property will carry
* the base MO class name as a string.
*/
const string BASE_MO_CLASS =
  KernelCmNotifDefs::AttributeNameValue::BASE_MO_CLASS;

/**
* This constant defines the name of the
* base MO instance property,
* which is transported in the filterable_body
* fields.
* The value part of this property will carry
* the base MO distinguished name as a string.

```



```
*/
const string BASE_MO_INSTANCE =
    KernelCmNotifDefs::AttributeNameValue::BASE_MO_INSTANCE;

/**
 * This constant defines the name of the
 * scope property,
 * which is transported in the filterable_body
 * fields.
 * The data type for the value of this property
 * is KernelCmNotifDefs::ScopePara.
 */
const string SCOPE =
    KernelCmNotifDefs::AttributeNameValue::SCOPE;
};

};

#endif
```

End of Change in Clause Annex B
--

Annex C (informative): Change history

Change history							
Date	TSG #	TSG Doc.	CR	Rev	Subject/Comment	Old	New
Sep 2002	S_17	SP-020466	--	--	Submitted to TSG SA #17 for Approval	1.0.0	5.0.0

CR-Form-v7

CHANGE REQUEST

⌘ **32.662 CR 001** ⌘ rev **-** ⌘ Current version: **5.0.0** ⌘

For **HELP** on using this form, see bottom of this page or look at the pop-up text over the ⌘ symbols.

Proposed change affects: UICC apps ME Radio Access Network Core Network

Title:	⌘	Add description of notifyCMSynchronizationRecommended notification for KernelCM IRP.
Source:	⌘	S5
Work item code:	⌘	OAM-NIM
		Date: ⌘ 28/02/2003
Category:	⌘	B
		<div style="display: flex; justify-content: space-between;"> <div style="width: 45%;"> <p><i>Use one of the following categories:</i></p> <p>F (correction)</p> <p>A (corresponds to a correction in an earlier release)</p> <p>B (addition of feature),</p> <p>C (functional modification of feature)</p> <p>D (editorial modification)</p> <p>Detailed explanations of the above categories can be found in 3GPP TR 21.900.</p> </div> <div style="width: 45%;"> <p><i>Use one of the following releases:</i></p> <p>2 (GSM Phase 2)</p> <p>R96 (Release 1996)</p> <p>R97 (Release 1997)</p> <p>R98 (Release 1998)</p> <p>R99 (Release 1999)</p> <p>Rel-4 (Release 4)</p> <p>Rel-5 (Release 5)</p> <p>Rel-6 (Release 6)</p> </div> </div>

Reason for change:	⌘	The KernelCM IRP lacks the notification which informs NM that great deal of changed configuration information in the managed system should be synchronized.
Summary of change:	⌘	Add the behaviour and contents of notifyCMSynchronizationRecommended notification.
Consequences if not approved:	⌘	If there are large changes generated in the network, it is inefficient to send lots of notifications such as "notifyObjectCreation", "notifyObjectDeletion" or "notifyObjectAttributeValueChange" to IRPManager through Itf-N.

Clauses affected:	⌘	7.1, 7.4, 7.5, 7.6, 7.7, Annex A								
Other specs affected:	⌘	<table border="1" style="display: inline-table; border-collapse: collapse; text-align: center;"> <tr> <td style="width: 20px;">Y</td> <td style="width: 20px;">N</td> </tr> <tr> <td style="width: 20px;"> </td> <td style="width: 20px;">X</td> </tr> <tr> <td style="width: 20px;"> </td> <td style="width: 20px;">X</td> </tr> <tr> <td style="width: 20px;">X</td> <td style="width: 20px;"> </td> </tr> </table> <div style="display: inline-block; vertical-align: middle; margin-left: 10px;"> <p>Other core specifications</p> <p>Test specifications</p> <p>O&M Specifications</p> </div> ⌘ 32.663, 32.664	Y	N		X		X	X	
Y	N									
	X									
	X									
X										
Other comments:	⌘	<p>This is a Child CR of 32661CR002 S5-036335</p> <p>This is a Parent CR to 32663CR002 S5-027033</p> <p>This is a Parent CR to 32664CR001 S5-036334</p> <p style="color: cyan;">Alignment of CMCC/SA5 CM framework</p>								

How to create CRs using this form:

Comprehensive information and tips about how to create CRs can be found at <http://www.3gpp.org/specs/CR.htm>. Below is a brief summary:

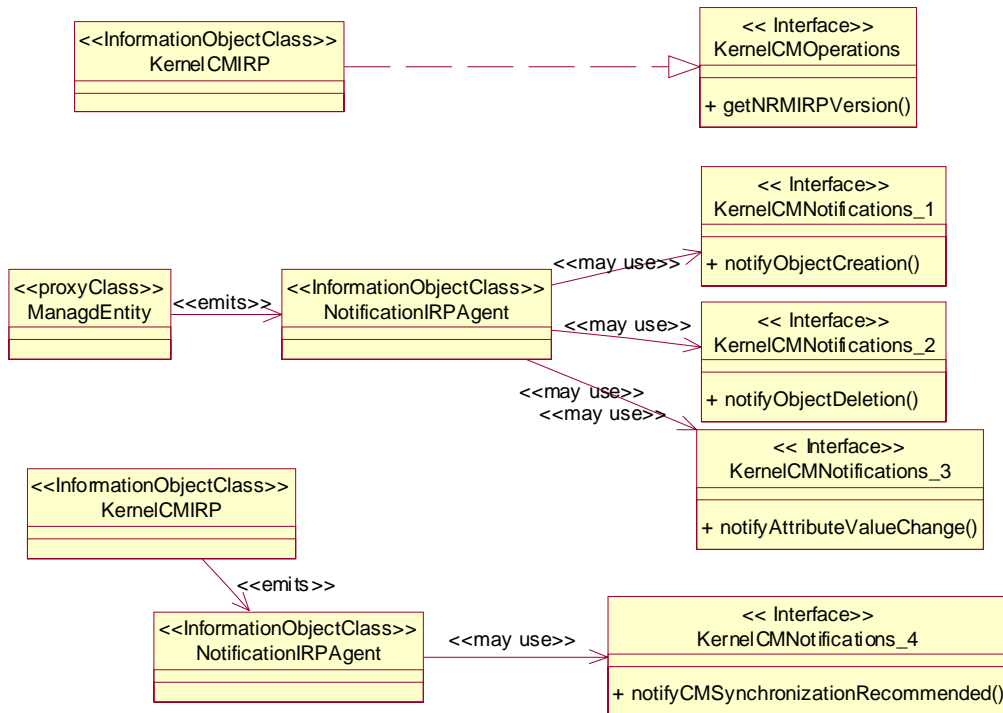
- 1) Fill out the above form. The symbols above marked ⌘ contain pop-up help information about the field that they are closest to.

- 2) Obtain the latest version for the release of the specification to which the change is proposed. Use the MS Word "revision marks" feature (also known as "track changes") when making the changes. All 3GPP specifications can be downloaded from the 3GPP server under <ftp://ftp.3gpp.org/specs/> For the latest version, look for the directory name with the latest date e.g. 2001-03 contains the specifications resulting from the March 2001 TSG meetings.
- 3) With "track changes" disabled, paste the entire CR form (use CTRL-A to select it) into the specification just in front of the clause containing the first piece of changed text. Delete those parts of the specification which are not relevant to the change request.

Change in Clause 7.1

7 Interface Definition

7.1 Class diagram



End of Change in Clause 7.1

7.2 Generic rules

Rule 1: Each operation with at least one input parameter supports a pre-condition `valid_input_parameter` which indicates that all input parameters shall be valid with regards to their information type. Additionally, each such operation supports an exception `operation_failed_invalid_input_parameter` which is raised when pre-condition `valid_input_parameter` is false. The exception has the same entry and exit state.

Rule 2: Each operation with at least one optional input parameter supports a set of pre-conditions `supported_optional_input_parameter_xxx` where "xxx" is the name of the optional input parameter and the pre-condition indicates that the operation supports the named optional input parameter. Additionally, each such operation supports an exception `operation_failed_unsupported_optional_input_parameter_xxx` which is raised when (a) the pre-condition `supported_optional_input_parameter_xxx` is false and (b) the named optional input parameter is carrying information. The exception has the same entry and exit state.

Rule 3: Each operation shall support a generic exception `operation_failed_internal_problem` that is raised when an internal problem occurs and that the operation cannot be completed. The exception has the same entry and exit state.

7.3 Interface KernelCmIRPOperations

7.3.1 Operation `getNRMIRPVersion` (M)

7.3.1.1 Definition

When the IRPManager invokes `getNRMIRPVersion` to find out the Network Resource IRP SS document versions (IRPVersions) supported by the IRPAgent, the IRPAgent shall respond, via the `versionNumberList` output parameter, with a list of supported Network Resource IRPversions. An example of this return value can contain two IRPVersions, where one indicates the 3GPP Generic Network Resource IRPVersion (e.g. "TS 32.623 V4.2" in case of CORBA implementation) while the other indicates the 3GPP UTRAN Network Resource IRPVersion (e.g. "TS 32.643 V4.1" in case of CORBA implementation).

It is expected that vendors may provide vendor-specific extended capabilities and features (VSE) that are based on a 3GPP published specification. It is further expected that the vendor will publish these VSE in a document with an unambiguous identification.

If an IRPAgent does not support VSE, the `vSEVersionNumberList` parameter shall contain no information.

If an IRPAgent supports VSE, the `vSEVersionNumberList` parameter shall contain identification of one or more documents published by the vendor. The `versionNumberList` shall contain the IRPVersions indicating the 3GPP Network Resource IRP specifications on which the VSE is based. The `versionNumberList` may only identify IRPVersions that are consistent with the requirements of clause 4.2 of the present document and similar requirements statements in all CM and Network Resource IRPs. The convention to identify the vendor-specific document is not a subject of the present document. It is recommended that the identification should include (a) the 3GPP IRPVersion on which the VSE is based (b) the name of the vendor and (c) the identification of the VSE document and/or its version. The inclusion of the part-(b) is to avoid possible name conflict in a multi-vendor environment. An example would be "TS 32.642 V4.0 Ericsson v.1". This sample indicates the identification of a document published by Ericsson that specifies a list of VSE that is based on the "TS 32.642 V4.0.x". Note in this example, the IRPVersion "TS 32.642 V4.0" shall also be present in the `versionNumberList`.

The lists returned by `versionNumberList` and `vSEVersionNumberList` shall not contain duplicates.

7.3.1.2 Input parameters

None.

7.3.1.3 Output parameters

Parameter Name	Qualifier	Matching Information	Comment
<code>versionNumberList</code>	M	ManagedGenericIRP.iRPVersion	It carries one or more SS version numbers supported by this IRP agent.
<code>vSEVersionNumberList</code>	M	ManagedGenericIRP.iRPVersion	It carries one or more identifications of vendor published documents containing VSE NRMs specifications.
<code>status</code>	M	ENUM (Operation succeeded, Operation failed)	If <code>operation_failed_internal_problem</code> status = <code>OperationFailed</code> .

7.3.1.4 Pre-condition

None specific.

7.3.1.5 Post-condition

None specific.

7.3.1.6 Exceptions

None specific.

Change in Clause 7.4

7.4 Interface KernelCmIRPNotifications_1

7.4.1 notifyObjectCreation (O)

7.4.1.1 Definition

IRPAgent notifies the subscribed IRPManager that a new Managed Object has been created and that the new object satisfies the filter constraint expressed in IRPManager's `subscribe` operation (see TS 32.302 [3]). This notification is based on the `objectCreation` notification type specified in ITU-T Recommendation X.721 [8] and ITU-T Recommendation X.730 [9] (difference compared to these specifications are indicated in the description below).

7.4.1.2 Input Parameters

Parameter Name	Qualifier	Matching Information	Comment
<code>objectClass</code>	M,F	<code>ManagedEntity.objectClass</code>	Notification header - see [3].
<code>objectInstance</code>	M,F	<code>ManagedEntity.objectInstance.</code>	Notification header - see [3].
<code>notificationId</code>	M	This carries the semantics of notification identifier.	Notification header - see [3].
<code>eventTime</code>	M,F	<code>ManagedEntity.creationTime</code>	Notification header - see [3].
<code>systemDN</code>	C,F	IRPAgent.systemDN where the IRPAgent is related to the KernelCmIRP.	Notification header - see [3].
<code>notificationType</code>	M,F	Mapped to <code>notificationType</code> in [3] – see annex A	Notification header - see [3].
<code>correlatedNotifications</code>	O	See comment.	A set of notifications that are correlated to the subject notification. Defined in ITU-T Recommendation X.733 [10].
<code>additionalText</code>	O	Text.	It can contain further information on the creation of the MO.
<code>sourceIndicator</code>	O	ENUM(Resource_operation, Management_operation, Unknown)	This parameter, when present, indicates the source of the operation that led to the generation of this notification. It can have one of the following values: resource operation: The notification was generated in response to an internal operation of the resource; management operation: The notification was generated in response to a management operation applied across the managed object boundary external to the managed object; unknown: It is not possible to determine the source of the operation.
<code>attributeList</code>	O	LIST OF SEQUENCE <AttributeName, AttributeValue>	The attributes (name/value pairs) of the created MO.

NOTE: F in the Qualifier column denotes a Filterable Parameter.

7.4.1.3 Triggering Event

7.4.1.3.1 From-state

`stateBeforeObjectCreation.`

Assertion Name	Definition
<code>stateBeforeObjectCreation</code>	The number of instances of the IOC ManagedEntity is equal to N.

7.4.1.3.2 To-state

stateAfterObjectCreation.

Assertion Name	Definition
stateAfterObjectCreation	The number of instances of the IOC ManagedEntity is equal to N + 1.

End of Change in Clause 7.4

Change in Clause 7.5

7.5 Interface KernelCmIRPNotifications_2

7.5.1 notifyObjectDeletion (O)

7.5.1.1 Definition

IRPAgent notifies the subscribed IRPManager of a deleted Managed Object. The IRPAgent invokes this notification because the subject notification satisfies the filter constraint expressed in the IRPManager subscribe operation (see TS 32.302 [3]). This notification is based on the objectDeletion notification type specified in ITU-T Recommendation X.721 [8] and ITU-T Recommendation X.730 [9] (difference compared to these specifications are indicated in the description below).

Note that when a Managed Object is deleted, all subordinate Managed Objects (i.e. the complete sub-tree of the MIB) are also deleted. Furthermore, all associations where the Managed Object participates are deleted.

7.5.1.2 Input Parameters

Parameter Name	Qualifier	Matching Information	Comment
objectClass	M,F	ManagedEntity.objectClass	Notification header - see [3].
objectInstance	M,F	ManagedEntity.distinguishedName.	Notification header - see [3].
notificationId	M	This carries the semantics of notification identifier.	Notification header - see [3].
eventTime	M,F	ManagedEntity.deletionTime	Notification header - see [3].
systemDN	C,F	IRPAgent.systemDN where the IRPAgent is related to the KernelCmIRP.	Notification header - see [3].
notificationType	M,F	Mapped to notificationType in [3] – see annex A	Notification header - see [3].
correlatedNotifications	O	See comment	A set of notifications that are correlated to the subject notification. Defined in ITU-T Recommendation X.733 [10].
additionalText	O	Text	It can contain further information on the deleted MO.
sourceIndicator	O	ENUM(Resource_operation, Management_operation, Unknown)	This parameter, when present, indicates the source of the operation that led to the generation of this notification type. It can have one of the following values: <ul style="list-style-type: none"> resource operation: The notification was generated in response to an internal operation of the resource; management operation: The notification was generated in response to a management operation applied across the managed object boundary external to the managed object; unknown: It is not possible to determine the source of the operation.
attributeList	O	LIST OF SEQUENCE <AttributeName, AttributeValue>	The attributes (name/value pairs) of the deleted MO.

NOTE: F in the Qualifier column denotes a Filterable Parameter.

7.5.1.3 Triggering Event

7.5.1.3.1 From-state

stateBeforeObjectDeletion.

Assertion Name	Definition
StateBeforeObjectDeletion	The number of instances of the IOC ManagedEntity is equal to N.

7.5.1.3.2 To-state

stateAfterObjectDeletion.

Assertion Name	Definition
stateAfterObjectDeletion	The number of instances of the IOC ManagedEntity is equal to N - 1.

End of Change in Clause 7.5

Change in Clause 7.6

7.6 Interface KernelCmIRPNotifications_3

7.6.1 notifyAttributeValueChange (O)

7.6.6.1 Definition

IRPAgent notifies the subscribed IRPManager of a change of one or several attributes of a Managed Object in the NRM. The IRPAgent invokes this notification because the subject notification satisfies the filter constraint expressed in the IRPManager subscribe operation (see TS 32.302 [3]). This notification is based on the attributeValueChange notification type specified in ITU-T Recommendation X.721 [8] and ITU-T Recommendation X.730 [9] (difference compared to these specifications are indicated in table 7).

7.6.6.2 Input Parameters

Parameter Name	Qualifier	Matching Information	Comment
objectClass	M,F	ManagedEntity.objectClass	Notification header - see [3].
objectInstance	M,F	ManagedEntity.distinguishedName.	Notification header - see [3].
notificationId	M	This carries the semantics of notification identifier.	Notification header - see [3].
eventTime	M,F	ManagedEntity.AttributeValueChangedTime	Notification header - see [3].
systemDN	C,F	IRPAgent.systemDN where the IRPAgent is related to the KernelCmIRP.	Notification header - see [3].
notificationType	M,F	Mapped to notificationType in [3] – see annex A	Notification header - see [3].
correlatedNotifications	O	See comment	A set of notifications that are correlated to the subject notification. Defined in ITU-T Recommendation X.733 [10].
additionalText	O	Text.	It can contain further information on the attribute change of the MO.
sourceIndicator	O	ENUM(Resource_operation, Management_operation, Unknown)	This parameter, when present, indicates the source of the operation that led to the generation of this notification type. It can have one of the following values: resource operation: The notification was generated in response to an internal operation of the resource; management operation: The notification was generated in response to a management operation applied across the managed object boundary external to the managed object; unknown: It is not possible to determine the source of the operation.
attributeValueChange	M	LIST OF SEQUENCE <AttributeName, NewAttributeValue, CHOICE [NULL, OldAttributeValue]>	The changed attributes (name/value pairs) of the MO (with both new and, optionally, old values).

NOTE: F in the Qualifier column denotes a Filterable Parameter.

7.6.6.3 Triggering Event

7.6.6.3.1 From-state

stateBeforeAttributeValueChange.

Assertion Name	Definition
stateBeforeAttributeValueChange	

7.6.6.6.2 To-state

stateAfterAttributeValueChange.

Assertion Name	Definition
stateAfterAttributeValueChange	

End of Change in Clause 7.6

Change in Clause 7.7

7.7 Interface KernelCmIRPNotifications_4

7.7.1 notifyCMSynchronizationRecommended (O)

7.7.1.1 Definition

IRPAgent notifies the subscribed IRPManager that part of or whole configuration information of the IRPAgent should be synchronized.

The configuration information may lose consistency between IPRAgent and IRPManager for several reasons, such as communication failure, NE or EM restarting/initialisation, new network elements being added into networks, etc. In such cases, the configuration information should be synchronized between IRPManager and IRPAgent. Normally, when there are changes in IRPAgent, these changes are sent to IRPManager through notifications like “notifyObjectCreation”, “notifyObjectDeletion” or “notifyObjectAttributeValueChange”. If there are large changes generated in the network, it may be inefficient to send lots of notifications to IRPManager through Itf-N. The notification “notifyCMSynchronizationRecommended” is used in this case to efficiently inform the IRPManager of large changes in CM.

In all cases, the baseMOClass, baseMOInstance and scope parameters specify the set of managed network resources whose information should be synchronized.

The recommendation is to send only this notifyCMSynchronizationRecommended notification in such event as described above, but there is no guarantee that the IRPAgent succeeds in suppressing all the other CM notifications related to MOs defined by the baseMOClass, baseMOInstance and scope parameters.

If the IRPAgent suppresses any of “notifyObjectCreation”, “notifyObjectDeletion” or “notifyObjectAttributeValueChange”, the IRPManager must subscribe the “notifyCMSynchronizationRecommended” in order to be aware of the changes.

Whenever notifications are suppressed, “notifyCMSynchronizationRecommended” must follow as early as possible.

7.7.1.2 Input Parameters

Parameter Name	Qualifier	Matching Information	Comment
objectClass	M,F	KernelCMIRP.objectClass	Notification header - see [3].
objectInstance	M,F	KernelCMIRP.objectInstance	Notification header - see [3]. This and object class shall contain the same information as systemDN.
notificationId	M	This carries the semantics of notification identifier.	Notification header - see [3].
eventTime	M,F	ManagedEntity.creationTime	Notification header - see [3].
systemDN	C,F	IRPAgent.systemDN where the IRPAgent is related to the KernelCmIRP.	Notification header - see [3].
notificationType	M,F	Mapped to notificationType in [3] – see annex A	Notification header - see [3].
baseMOClass	M	ManagedEntity.objectClass.	It specifies the class of the root managed entity of a whole subtree, of which the configuration information should be synchronized by NM.
baseMOInstance	M	ManagedEntity.objectInstance.	It specifies the root managed entity of a whole subtree, of which the configuration information should be synchronized by NM.
scope	M	<pre>enum ScopeType { BASE_ONLY, BASE_NTH_LEVEL, BASE_SUBTREE, BASE_ALL }; struct ScopePara { ScopeType type; unsigned long level; };</pre>	The scope specifies the number of levels in the tree below the baseMOInstance which are affected by this notification.
additionalText	O	Text.	It can contain further information on this notification.

NOTE: F in the Qualifier column denotes a Filterable Parameter.

7.7.1.3 Triggering Event

7.7.1.3.1 From-state

iRPAgentInitialisation OR largeChangesDetected

Assertion Name	Definition
iRPAgentInitialisation	The IPRAgent begins its internal initialisation and subsequently requires synchronization with the network resources.
largeChangesDetected	The IRPAgent has detected that large changes has taken place in the network, which requires synchronization with the network resources.

7.7.1.3.2 To-state

iRPAgentSuccessEmitNotification

Assertion Name	Definition
iRPAgentSuccessEmitNotification	IRPAgent finished emitting notifyCMSynchronizationRecommended notification.

End of Change in Clause 7.7

Change in Clause Annex A

Annex A (normative): Notification/Event Types

Notification IRP: Information Service [3] defines an attribute called `notificationType` that shall be present in all notifications. The present document defines an attribute called `eventType` that shall be present in all CM notifications defined herein. The mapping of this `eventType` to the `notificationType` is that they are semantically equal for the CM notifications. Thus, the event types described below (also the same as in Release 99) shall be mapped to the `notificationType` of the notification header.

This annex lists and explains Event Types used by Kernel CM IRP and then lists the Event Types valid for each notification in this IRP.

Encoding of `eventType` is Solution Set dependent. For example, the value of `eventType` may be encoded as an Object Identifier in the CMIP SS and as a numeric string in the CORBA SS.

The tables below may be extended in the future.

Table A.1: Event Types

Event Types	Explanation
Object creation	A notification of this type indicates that a new managed object instance has been created (as defined in ITU-T Recommendation X.721 [8] and ITU-T X.730 [9]).
Object deletion	A notification of this type indicates that a managed object instance has been deleted (as defined in ITU-T Recommendation X.721 [8] and ITU-T Recommendation X.730 [9]).
Attribute value change	A notification of this type indicates that the value(s) of one or more attributes have changed (as defined in ITU-T Recommendation X.721 [8] and ITU-T Recommendation X.730 [9]).
CM synchronization recommended	A notification of this type informs NM that part of or the whole configuration information of the managed system should be synchronized.

Table A.2: Event types applicable to each Notification

Notification	Event Type
<code>notifyObjectCreation</code>	Object creation
<code>notifyObjectDeletion</code>	Object deletion
<code>notifyAttributeValueChange</code>	Attribute value change
<code>notifyCMSynchronizationRecommended</code>	CM synchronization recommended

End of Change in Clause Annex A
--

Annex B (informative): Change history

Change history							
Date	TSG #	TSG Doc.	CR	Rev	Subject/Comment	Old	New
Mar 2002	S_15	SP-020034	--	--	Submitted to TSG SA #15 for Information	1.0.0	
Sep 2002	S_17	SP-020465	--	--	Submitted to TSG SA #17 for Approval	2.0.0	5.0.0