3GPP Network Management
CS7012 Unit 3 Telecoms Management
Part 2: Information Modelling - NRM (MIMs)
Part 2: Information Modelling - NRMss (MIMs)

- Across the Itf-N all manageable resources of the 3G network (functional and physical resources) are represented as Managed Object Instances (MOI) of a Network Resource Model (NRM).
  - Assumes that EM has a more detailed model
- NRM identifies NRs to the level of detail required by FM and PM at the NM level.
- In addition to NR identification, the NRM also supports the alarm surveillance part of FM by defining which alarms can be notified by which Managed Object Classes (MOCs).
Basic NRM Concepts

• Managed Object (MO):
  – a software object that encapsulates the manageable characteristics and behaviour of a particular Network Resource
  – An instance of a MO class (MOC/IOC) defined in a MIM/NRM
  – Can have attributes, operations and notifications

• Management Information Base (MIB):
  – An instance of an NRM/MIM
  – Consists of
    • A namespace describing the MO containment hierarchy in the MIB through Distinguished Names
    • a number of Managed Objects with their attributes
    • a number of Associations between these MOs
Basic NRM Concepts 2

- Associations can exist between MOs via
  - Name bindings (always used for containment)
  - Reference attributes (generally used for non-containment assoc)
  - Association objects
- Can have qualifiers (Mandatory/Optional/Conditional)
  - For MO attributes (R/W/S), operations, notifications
Structure of NRM Standards

• Generic NRM
• Core NRM
• UTRAN NRM
• GERAN NRM
• Plan to also have ones based on functional areas of management eg Security
Generic NRM Containment/Naming Structure

```
<<InformationObjectClass>>
Top
<<InformationObjectClass>>
VsDataContainer
<<InformationObjectClass>>
0..n
1
0..n
<<names>>
1
ManagedFunction ...
<<InformationObjectClass>>
IRPAgent
<<InformationObjectClass>>
0..n
+manager
0..n
+subordinate
<<InformationObjectClass>>
GenericIRP
<<InformationObjectClass>>
0..n
<<InformationObjectClass>>
SubNetwork
<<InformationObjectClass>>
MeContext
<<InformationObjectClass>>
0..n
<<names>>
{{xor}}
<<names>>
<<names>>
<<names>>
<<InformationObjectClass>>
ManagedElement
<<InformationObjectClass>>
0..1
<<names>>
<<InformationObjectClass>>
ManagementScope
<<names>>
<<names>>
<<InformationObjectClass>>
<<InformationObjectClass>>
<<InformationObjectClass>>
0..n
<<InformationObjectClass>>
<<InformationObjectClass>>
<<InformationObjectClass>>
0..n
<<InformationObjectClass>>
<<InformationObjectClass>>
<<InformationObjectClass>>
0..n
<<InformationObjectClass>>
<<InformationObjectClass>>
<<InformationObjectClass>>
0..n
```

PA4
Core Network NRM

- Defines IoCs (MOCs) for 31 Core N/W Entities + Links
  - Eg MscServerFunction, represents MSCserver functionality
    - Notifications
      - notifyAckStateChanged
      - notifyAttributeValueChange
      - notifyChangedAlarm
      - notifyClearedAlarm
      - notifyNewAlarm
      - notifyObjectCreation
      - notifyObjectDeletion
      - notifyComments
      - notifyAlarmListRebuilt
      - notifyPotentialFaultyAlarmList
    - Also 21 types of Relationship, 42 Attributes
UTRAN NRM

- Universal Terrestrial Radio Access Network (UTRAN) NRM
- 6 IoCs
- 3 Relationships
- 32 Attributes
GERAN NRM

- GSM/EDGE Radio Access Network NRM
- 6 IoCs
- 2 Relationships
- 25 Attributes
NRM Solution Sets (Technical Realisations)

• 4 SS already defined:
  – CORBA/IDL, CMIP/GDMO, SOAP and XML
• XML used for bulk CM file format definition
  – Map NRM UML IoCs to names
  – Define config data and session log file format schema
• CORBA used for basic + bulk CM operations/interface def
  – Map NRM UML IoCs to names
  – Map NRM attributes to name/type pairs
• SOAP used for Alarm/Fault management
Part 3 Overview of Available IRPs

GenericIRP  Notification

Base Management functionality

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<th>PM:</th>
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Management functionality

Information models

Generic NRM  UTRAN NRM  E-UTRAN NRM  GERAN NRM  Core NRM

IMS NRM  Inventory NRM  Transport NRM  Signaling NRM
Where to get more information

• The 3GPP website: http://www.3gpp.org

• All standards relating to management are known as the “32” series => document numbers start with 32.

• Documents names/numbers have the form
  {Series}{Specification}-{Release}{Major Rev}{Minor Rev}
  – Eg: 32101-550, “Management Principles and High-Level Requirements”, release 5, version 5.0

• Useful Doc:
  – TR 21.905 V6.1.0 “Vocabulary for 3GPP Specifications“