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).
Common PLMN Entities
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

Diagram showing containment and naming structure in Generic NRM.
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 to XML Schema
  – 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

#### CM:
- **KernelCM**
- **BulkCM**
- **BasicCM**
- **Self-config**
- **Software Mgt**

#### FM:
- **Alarm**
- **Adv Alarm Mgt**
- **Test Mgt**

#### PM:
- **Performance**
- **Trace Mgt**

#### Special:
- **Delta Synch**
- **Entry Point**
- **FileTransfer**
- **Notification Log**
- **Commo Surveillance**
- **Partial Suspension of Itf-N**

#### 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](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“
Individual Exercise

• Go to IM 2015 Website,

• Select a paper that you would like the class to read, email me with the title/link 
  rbrenna@cs.tcd.ie Deadline: Fri 19th Feb

• Prepare a 2 minute pitch for your paper under these headings:
  – Contribution
  – SWOT for Network Management