IEEE P1900.4 WG

Information Modelling : The Way Forward

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Part(s) of the P1900.4 D0.01 (approved in Madrid) addressed by the document?

4. System Architecture	✓
5. Use Cases	✓
6. General System Requirements	
7. Functional baseline Architecture	
8. Information Model and Representation	✓
9. Procedures	
Other : *(please detail)*	

Purpose

- Review Information Modelling Concepts of IETF/DMTF
- Understand the level of abstraction required
- Finalise the information model section

Overview

- Best Common Practises
  - Context Information Model
  - Policy Information Model
- Examples
- Suggestions on the way forward
  - Abstract view of the system for Information Modelling

OTHER STANDARDS

Information Model vs. Data Model

(Informative)

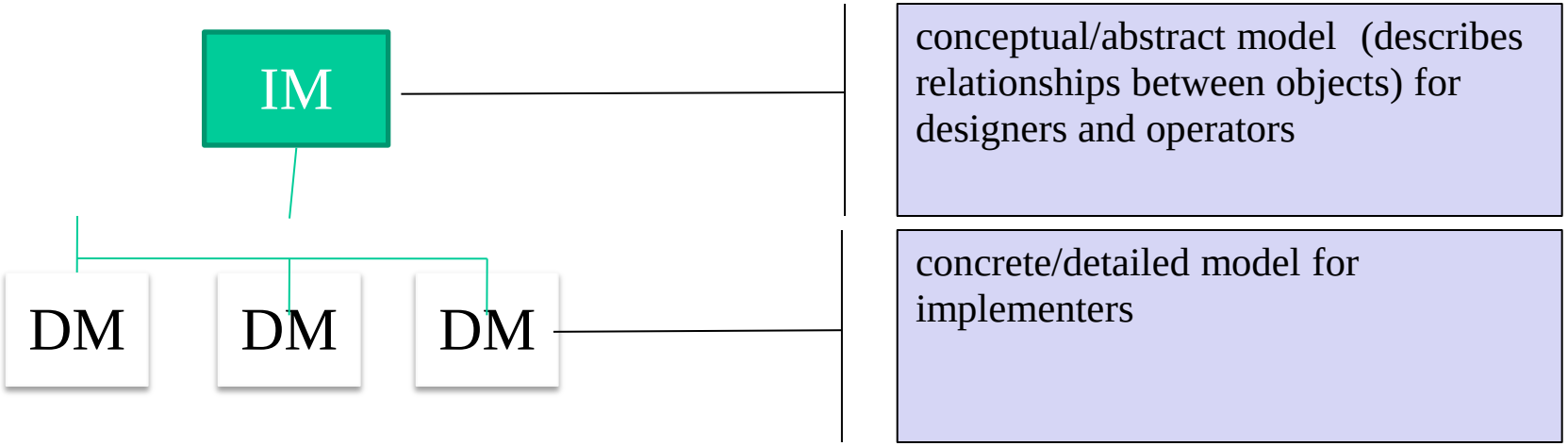
- Data Model:
  - A concrete representation of an information model in terms appropriate to a specific data store and access technology (include implementation- and protocol-specific details, e.g. rules that explain how to map managed objects on to lower-level protocol constructs)
- Information model:
  - An abstraction and representation of the entities in a managed environment - their properties, operations and relationships. It is independent of any specific repository, application, protocol or platform (model managed objects at a conceptual level, independent of any specific implementations or protocols used to transport the data. However, level of specificity varies based on needs of the designers)

- Note: Based on DMTF (CIM concept)/ IETF definitions (RFC3444) – These definitions are an outcome of IRTF NMRG workshop in 2000 with experts from IETF, DMTF and ITU

Information Model vs. Data Model

(Informative)

- Reference: RFC 3444



- Most IETF management models are Data models (MIBs, PIBs) so as CIM schema of DMTF

MODELLING POLICIES

Object-Oriented IM for Representing Policy Information (Informative)

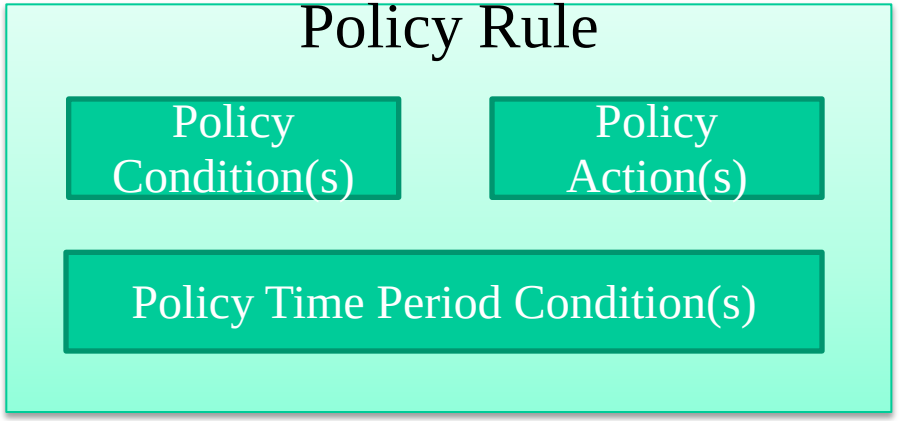
- Policy Core Information Model (Ref. RFC 3460)
  - Joint work of IETF policy framework work group and DMTF Policy WG
- Defined two class hierarchies
  - Structural classes representing policy information and control of policies
  - Association classes representing how instances of structural classes are related
- Generic & Extensible (current application areas: QoS, Security, business)

Declarative vs. Procedural Model (Informative)

- Declarative languages
  - Describe relationships between variables in terms of functions or inference rules, to which the interpreter or compiler can apply a fixed algorithm in order to produce a result (i.e., the sequence of steps for doing the processing of declarative statements tends to be left to the implementer)
- Procedural language
  - Specifies an explicit sequence of steps to follow in order to produce a result (such a strict action sequence will constrain the implementer)

(Ref. RFC 3060)

Policy Rule Class (RFC 3460) (Informative)



- Core Model is similar to what we have defined already in our proposal
- However, IETF/DMTF Policy Models cater for some additional requirements; e.g.
  - Policy Enforcement: Strict or Best Effort
  - Policy Priority: e.g. Defining an overall general rule with few exceptions
  - Policy Role: i.e. to simply rule filtering and conflict resolution
  - Policy Order: Required or recommended
  - policy categories and grouping: i.e. to simplify querying
  - Nested Policies: Decision strategies: All matching

Discussions – Info/Policy

- Use of OO approach for Policy Modelling?
- Do we need to define policy action sequences?
- Do we cover different deployment options?
- Options for modelling the exclusion/ dependency of instances?
- Other requirements? Priority, Order, Roles, Enforcement etc.
- Class Hierarchy/ UML representation for Policy and Context Information Models?

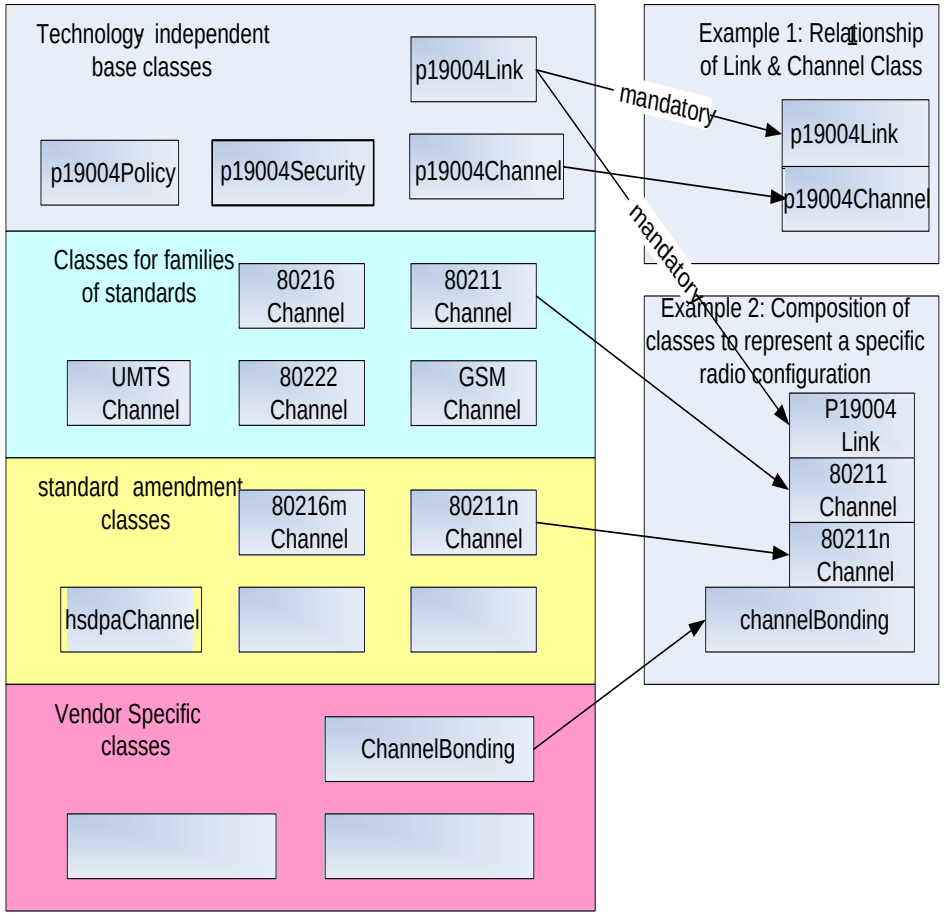
EXAMPLE/ LEVEL OF ABSTRACTION (INFORMATION MODEL)

Context / Measurements

- Generic abstraction
  - Measurements:
    - Network
    - Terminal
    - User / application
    - …
  - Profiles:
    - Terminal
    - Service
    - …

Example Hierarchical Abstraction (Composition / Association)

- Composite Network
  - Area (geographic)
    - RAT
      - Load
      - # users
- Terminal
  - Channel
    - Radio power indicator
  - Link
    - Error rate etc.



Generic Context Capabilities & Exceptions

Generic Capability

- Measurement
  - Granularity (timing, triggering)
  - Precision / Accuracy
  - Type
- Statistics
  - Historical data
  - Window / interval
  - Operation (min,max,avg etc.)
  - Indexing method

Example Exception Cases

- Requested to perform measurement that is not possible (timing accuracy)
  - Do best it can
  - Return exception
- Requested to perform unsupported statistical operation
  - Do closest matching (e.g. avg)
  - Return exception

Conditional context retrieval

- Condition
  - Absolute threshold crossing
  - Delta change threshold
  - Another context dependency (return X when Y)
  - Event triggered (e.g. change of RAT)
- Languages
  - Structured query
  - RDF query

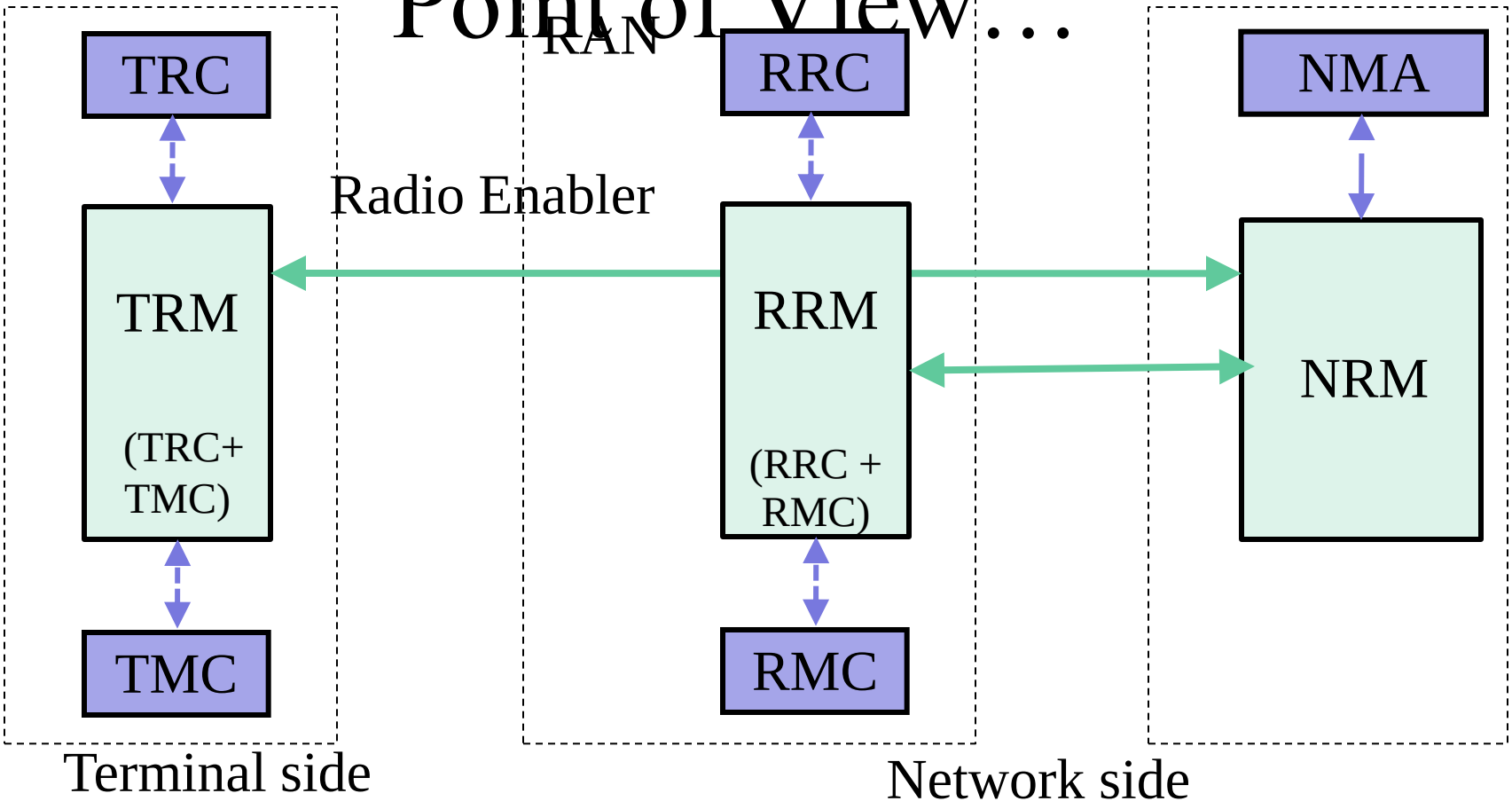
- Identify interfaces within the scope of P1900.4
- Define the metalanguage(s) used for P1900.4 info model
- Identify classes and their relationships (inheritance, containment) – as necessary for the interfaces
  - The system is abstracted as a tree of objects (helps to identify the objects)
- Identify common functions (utility functions) useful for P1900.4 system interfaces → define corresponding information model

INFORMATION MODEL OF P1900.4 – THE WAY FORWARD

Proposed SA Abstraction

- Abstract the split functionalities (i.e. MC & RC) at both Terminal and Network sides for Information Modelling purposes
- Could only separate the information flows in RAN side and Terminal side
- IM could best be kept independent from the specifics of functions and interfaces within SA
- We could state key information types as a kind of archetypes instead of interfaces-based information flows.
- For instance: Information types: Context (profiles, capabilities, configurations, preferences, measurements) + Policies (rules, conditions, roles, actions etc).

Logical Representation from IM Point of View…



Entity in the scope of P1900.4

Entity out of the scope of P1900.4

New structure for Information Model Section

- Initial sections will present the class structures for context and policy models
- Following five interfaces will be within the scope of P1900.4
  - 9.3 NRM --> TRM (Already have text for this part)
  - 9.4 TRM --> NRM (Already have text for this part)
  - 9.5 RRM --> NRM (Need more text complete this part)
  - 9.6 NRM --> RRM (Need text this part)
  - 9.7 TRM --> TRM (Need more complete this part)
- Above five sections will defines classes (both context and policy) specific to P1900.4

Discussions - General

- Are we happy with the proposed structure?
- Who will contribute to which section?

Discussion / Interfaces

- Which interfaces are within the scope of P1900.4 and WHY?

Interface	Within Scope (Y/N)	Requirement for standardization
TRM – NRM	Yes	Between TE Manufacturers & Operators
NRM – TRM	Yes	Between TE Manufacturers & Operators
TRM - TRM	Yes	Between different TE Manufacturers
RRM – NRM	Yes	Between NE Manufacturers & Operators
NRM – RRM	Yes	Between NE Manufacturers & Operators
RRM - RRM	Yes	Between different NE Manufacturers ?

References

- IETF RFC3460 (this updates RFC3060)
  - http://www.ietf.org/rfc/rfc3460.txt
- Example RFC 3670
  - http://www.faqs.org/rfcs/rfc3670.html
- DMTF CIM definitions
  - http://www.dmtf.org/standards/cim

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