

IEEE P1900.4 WG

Information Modelling : The Way Forward

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Authors:

Name	Company	Address	Phone	email
Mahesh Sooriyabandara, Tim Farnham	TREL			
Oliver Holland, Alireza Attar	KCL			
Kalus Naute	Alcatel-Lucent			
Makis Stamatelatos	UoA			

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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 : <i>(please detail)</i>	

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

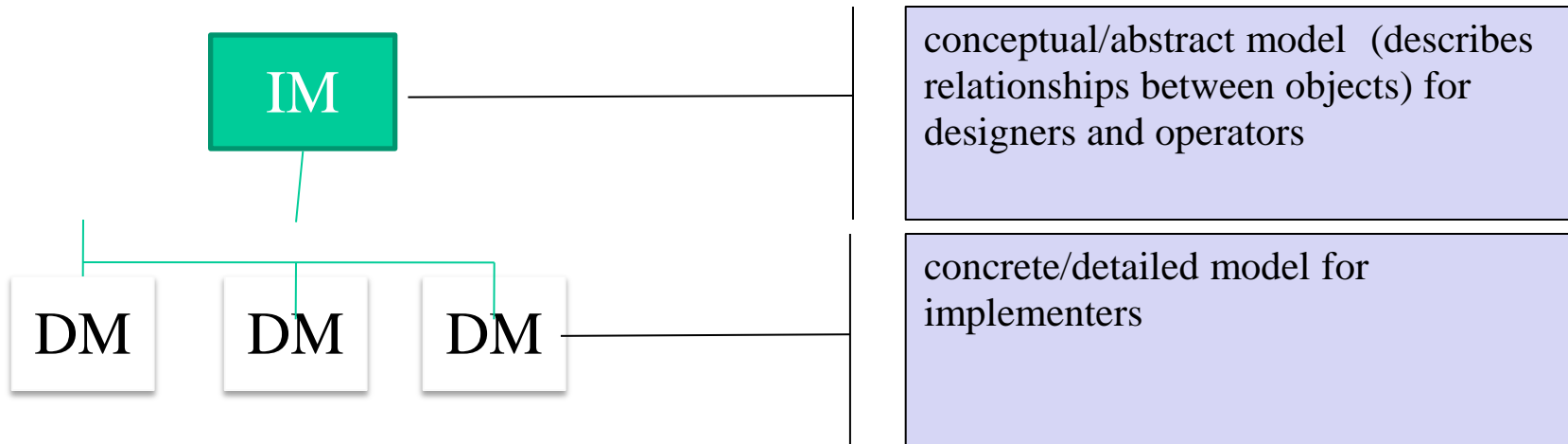
(Informative)

- ➔ 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)

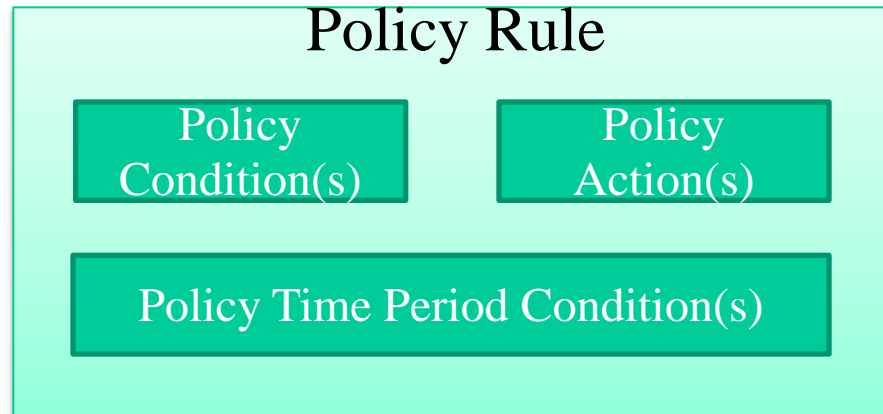
➔ Procedural language

- 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

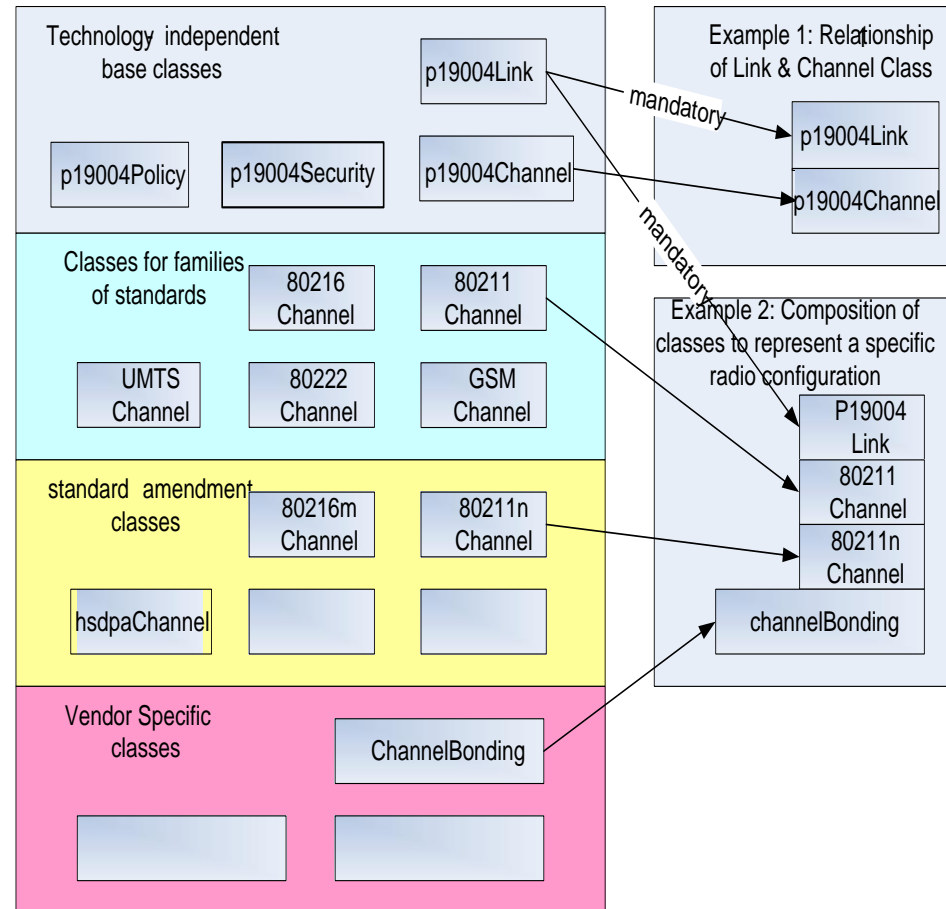
➔ Terminal

■ 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

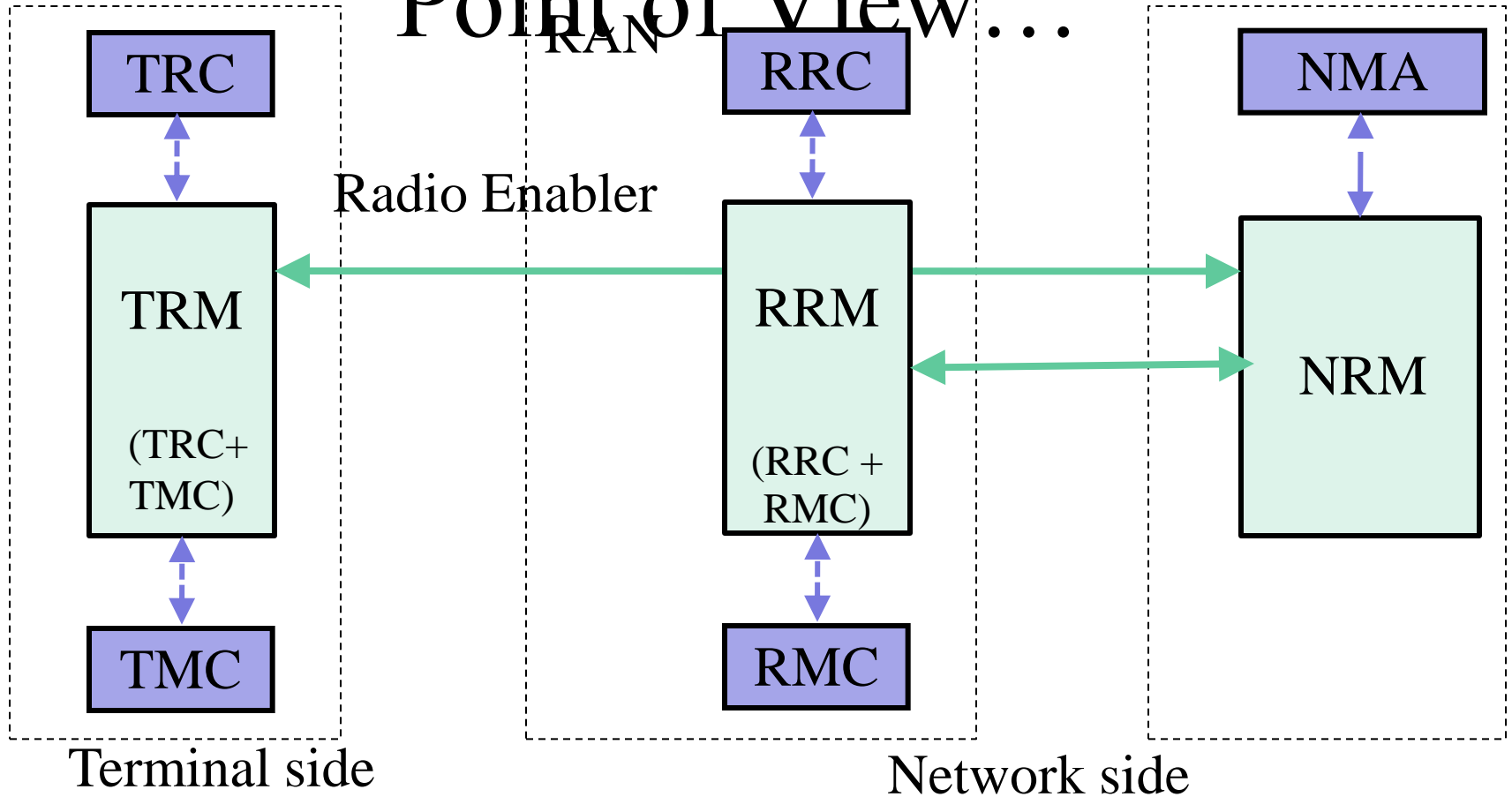
INFORMATION MODEL OF P1900.4 – THE WAY FORWARD

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...



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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