Project	**IEEE P1900.4 WG** http://www.ieeep1900.org/
Title	**Policy Information Structure**
DCN	
Date Submitted	
Source(s)	Makis Stamatelatos - UoA
Re:	
Abstract	
Purpose	
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1. Part(s) of the P1900.4 D0.01 (approved in Madrid) addressed by the document?

Please tick the section of the Baseline Document D0.01 addressed by this contribution.

4. *System Architecture* *Overall system architecture with main interfaces (subject to standardization) between the building blocks. Note: in this section generic interfaces should be considered only.*	
5. *Use Cases*	
5.1 *Dynamic Spectrum Allocation*	
5.2 *Dynamic Spectrum Access*	
5.3 *Distributed Radio Resource usage optimization*	
6. *General System Requirements* *This section contains a) generic requirements (use-case agnostic or common to all of the use cases). Note: the nature of this section (text only AND/OR high level modeling should be defined during the course of document "development".*	
7. *Functional baseline Architecture*	
7.1 *Dynamic Spectrum Allocation design realization*	
7.2 *Dynamic Spectrum Access design realization*	
7.3 *Distributed Radio Resource usage optimization design realization*	
8. *Information Model and Representation*	✓
9. *Procedures* *This section contains the procedures the TRM should follow in order to "consume" the information (of section 8) conveyed of the radio enabler. This section should also capture the behavior of the TRM with respect to the policies. Note: Working assumption: The protocol aspects are considered to be informative and should be taken into account by the protocol task group which will design the actual protocol.*	
9.1 *State Diagram(s)*	
10. *Annex*	
Other : *(please detail): proposed template for use case descriptions*	

2. Text proposal – Policy Information structure

In terms of supported functionality, policy provision and policy representation stand for Network Reconfiguration Management Functionalities relevant to the P1900.4 standardization activities. Furthermore, the Radio Enabler downlink content includes also information related to the concept of Policies that is interpreted as addressing/supporting the radio resource management in composite network (07-02-13). In the context of the P1900.4 activities it is necessary for both the policy content and structure/representation to be well defined. This subsection initiates the framework for the policy structure.

In a generic concept policies can derive from different stakeholders, such as network operators and device manufacturers; within the currently P1900.4 framework the concept is focusing to single Operator case where policies are generated within the Network Reconfiguration Management module and communicated to the Terminal Reconfiguration Management module through the Radio Enabler, as presented in previous sections.

At first glance, a Policy is considered as being composed by a number of specific rules. According to the provided functionality, two types of rules are identified, namely, constraint and action rules. Constraint rules represent a set of limitations and may provide a threshold-based mechanism for a decision making procedure; in other words as actions that are forbidden. In this sense, constraint rules may be considered as actions marked with "SHALL NOT" flag. Alike, action rules specify actions to be triggered when certain conditions are met; in other words as actions that are either mandatory or possible may be marked with "SHALL" or "CAN" flag, accordingly. Policy rules are of the form: IF <condition> THEN <action>/<constraint>.

In both cases, a specific rule includes two parts, a condition to be met and an action to be enforced; an individual rule is considered as a {condition C, action A} pair (example: if the condition is the location, the requirement is geolocation capability in the terminal).

In this sense, a policy may define several conditions and include several actions and or constraints; the corresponding relations that inter-connect the conditions, the actions and the constraints may be either the logical conjunction (OR) or the disjunction (AND) (example: {(condition C1 OR condition C2) AND condition C3; action A1 OR action A2}).

Furthermore, policies are prioritized in a hierarchical way. High level policies prescribe general guidelines, such as business objectives. On the other hand, lower level policies are more specific and are generally related with the implementation environment. Prioritization in policies provides a means of weighting between different policies that are to be enforced in the same context. The above presented policy structure is depicted in Figure 1-1.

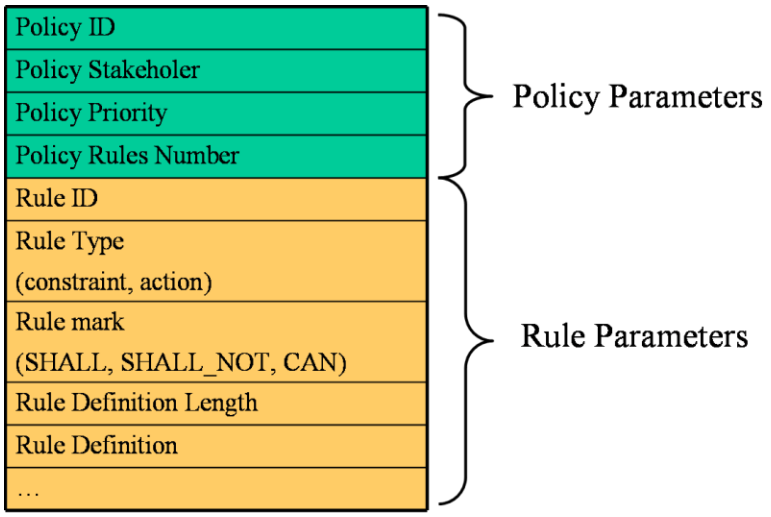

Figure 1-1: Serialized policy information representation

Policy information is organized in two sections: Policy Parameters and Rule Parameters.

Policy parameters provide general information about the communicated policy and include the following fields:

1. *Policy ID defines a unique policy identifier and is used for efficient policy storage and retrieval*
2. *Policy Stakeholder field stores the entity that issued the policy (Network Operator, Manufacturer, User etc) and defines the hierarchical level of the policy according to the specified stakeholder [for example when it comes to a change of RAT network operator policies are more important than manufacturer defined policies or user policies.*
3. *Policy Priority field is set to an integer value defining the priority of the policy and combined with the issuing stakeholder that defines the position of the policy in the policy hierarchy.*
4. *Policy Rules Number is set to an unsigned integer defining the number of rules that will follow.*

Rule parameters section is repeated for each rule composing the policy and is composed of the following fields:

5. *Rule ID provides a unique rule identifier.*
6. *Rule Type defines if the rule is a Constrain Rule or an Action Rule in order to be handled accordingly by the recipient entity.*
7. *Rule Mark marks the identified type of the ruls.*
8. *Rule Definition Length provides the length of the serialized SWRL rule definition that will follow.*
9. *Rule Definition provides a rule representation in the form of IF <condition> THEN <action>/<constraint>.*