Data Model for OpenETCS project

This document contents the list of items to take into account during the modelling activities, how to describe them and how there are linked.

List of items:

- Type
- Requirement
- Function
- Functional Block
- Variable
- Constant
- Packet

All the items are identified by:

- an ident: this ident shall be unique and allow to identify exactly the item. How to be defined the ident depend of the tools to manage the repository of items
- a name: the name is defined according naming convention (see first proposal https://github.com/openETCS/validation/wiki/Verification-Artifacts-Styleguide) and shall allow to identify the class of items (requirement, variable, function,...)

In the case that uniqueness is ensured on the names, and depending on the tools selected, we can avoid to use “ident”.

Type:

- Boolean
- Integer
- Floating point
- T_text: textual description
- T_ident: based on a textual description
- T_Version = {3.0.0, 3.3.0}

- T_VariableNature = {Acceleration, Distance, Gradient, Length, Miscellaneous, Number, ClassNumber, IdentityNumber, Qualifier, TimeDate, Speed, Text}
- T_SourceDocument = {subset-26, subset-34}
- T_Definition : a textual and graphical description (all kind of picture, table and diagram are allowed)

Requirement: T_Requirement

It is identified by the following attributes:

Name	Occurrence	Type	Description
Definition	1	T_Definition	Textual and graphical description of the requirement
Nature	1	• Structural • Functional • Definition	
Source	1	T_SourceDocument	the document where the requirement is defined the first time (SRS, FIS, SSRS,...)
Discussion	1 (Optional)	T_Text	Discussion or comment to clarify or justify the requirement

Requirements are links together by mother-child relations:

- a requirement can be refined (description can be clarified) in a child requirement
- a requirement can be split in several child requirements
- a requirement can be derived from several mother requirements

Variable: T_Variable

Name	Occurrence	Type	Description
Definition	1	T_Definition	Textual and graphical description of the variable
Source	1	T_SourceDocument	the document where the variable is defined the first time (SRS, FIS, SSRS,...)
Nature	1	T_VariableNature	Nature of the Variable (Acceleration, Speed, Ident,...)
MinimalValue	0..1	T_Text	
MaximalValue	0..1	T_Text	
SpecialValue	0..n	T_Text	
Allocation	1	• Interface • Packet • Internal	
Requirement	*1..n*	*T_Requirement*	*The set of requirement which defined the variable (at least one)*

Constant: T_Constant

Do we need to separate Variables and constants ?

Name	Occurrence	Type	Description
Definition	1	T_Definition	Textual and graphical description of the variable
Source	1	T_SourceDocument	the document where the variable is defined the first time (SRS, FIS, SSRS,...)
Nature	1	T_VariableNature	Nature of the Variable (Acceleration, Speed, Ident,...)
Value	1	T_Text	
Allocation	1	• Interface • Packet • Internal	
Requirement	*1..n*	*T_Requirement*	*The set of requirement which defined the constant (at least one)*

Function: T_Function

Name	Occurrence	Type	Description
Definition	1	T_Definition	Textual and graphical description of the function
Input	*0..n*	*T_Variable*	*Input variables of the function*
Output	*0..n*	*T_Variable*	*Output variables of the function*
Local	*0..n*	*T_Variable*	*Main internal variables of the function used to describe it*
Parameter	*0..n*	*T_Constant*	*Main constants and parameters used to describe the function*
Requirement	*0..n*	*T_Requirement*	*Requirements allocated to the function*
Block	*1 (optional)*	*T_FunctionalBlock*	

Functions are linked together by several kind of relation:

- mother-child relation: a function is split in several sub-functions
- sequential relation: a function shall occur before an another

Functional Block: T_FunctionalBlock

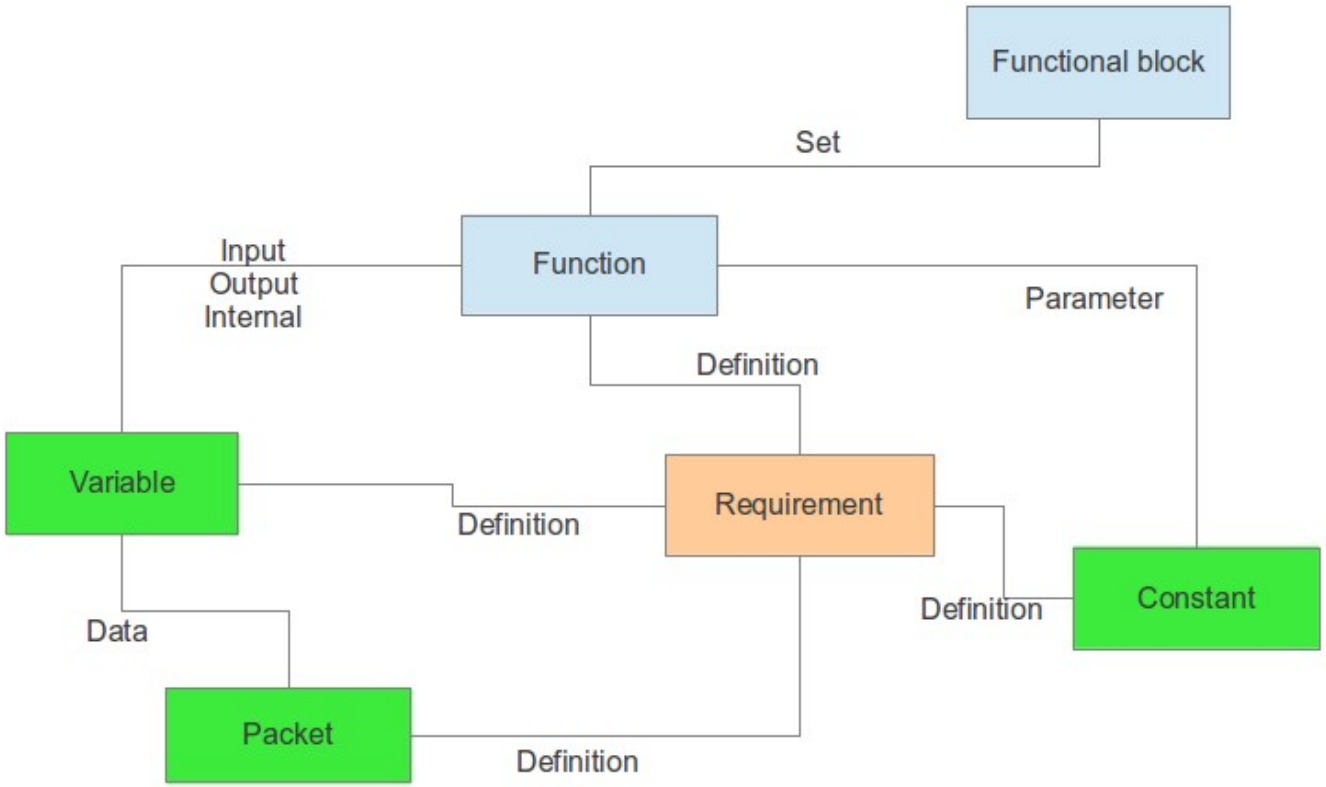
Are functional blocks really necessary ?

Name	Occurrence	Type	Description
Definition	1	T_Definition	Textual and graphical description of the function
Function	*1..n*	*T_Function*	*Set of function of this block*

Packet: T_Packet

Name	Occurrence	Type	Description
Definition	1	T_Definition	Textual and graphical description of the packets
Data	*0..n*	*T_Variable*	*Set of external variable transmitted*
Sender	1		
Receiver	1		
Requirement	*1..n*	*T_Requirement*	*The set of requirement which defined the packet (at least one)*

Links :


Functional block
Set
Function
Input
Output
Internal
Parameter
Definition
Variable
Requirement
Definition
Definition
Constant
Data
Packet
Definition