Marte by Time4Sys

REVISION HISTORY			
NUMBER	DATE	DESCRIPTION	NAME

Contents

Chapter 1

Introduction

This document presents the main result of the Waruna project, ie an Ecore implementation of the OMG's Marte specification. This implementation follow quite closely its original specification excepts in a few areas as explained in following chapter.

Chapter 2

Deviation from OMG Marte specication

2.1 Pattern of Activation

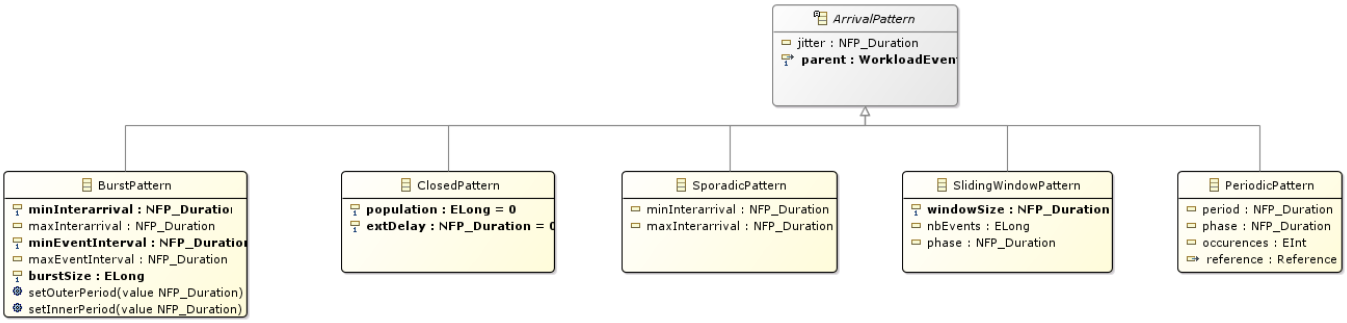

Figure 2.1: activation-pattern

Contraryly to the Marte specification, we have flatten the hierarchy and also haven't (yet?) implemented all pattern.

Table 2.1: Comparions of arrival pattern table

Pattern	Marte	Time4Sys	Description
PeriodicPattern	X	X	It describes periodic interarrival patterns, with an optional maximal deviation (jitter)
AperiodicPattern	X		It describes an unbounded pattern that is defined by a distribution function.
SporadicPattern	X	X	It describes a bounded pattern that is defined by a corner case interarrival times and a maximum deviation (jitter).
BurstPattern	X	X	It describes a bursty interarrival pattern with a number of events that can occur in a bounded period.
IrregularPattern	X		It describes an aperiodic pattern that is described by a table of successive interarrivals durations measured from a starting phase.
ClosedPattern	X		It describes a workload characterized by a fixed number of active or potential users or jobs that cycle between executing the scenario.

Table 2.1: (continued)

Pattern	Marte	Time4Sys	Description
OpenPattern	X		It describes a workload that is modeled as a stream of requests that arrive at a given rate in some predetermined pattern (such as Poisson arrivals).
SlidingWindowPattern		X	It describes a bounded pattern that is defined by the maximum number of events that can occur on a sliding window.

2.2 Links of Precedence between tasks

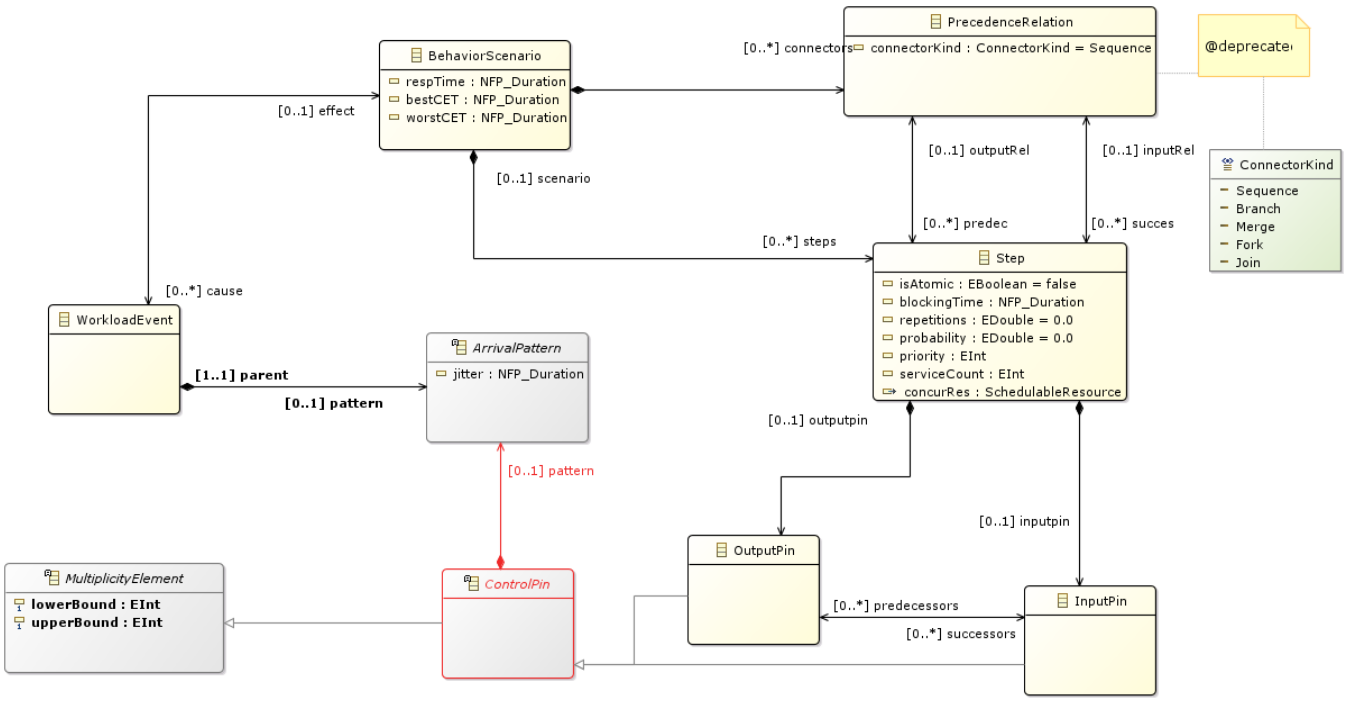

Figure 2.2: precedence-diagram

The model from Marte is not precise enough to express other than simple relationship. Thus we reuse the concepts of Pin from the UML 2.5 Activity Diagram.

NB: Shall we also reuse ActivityEdge instead of the successor-predecessor link?

2.3 EndToEnd Flow

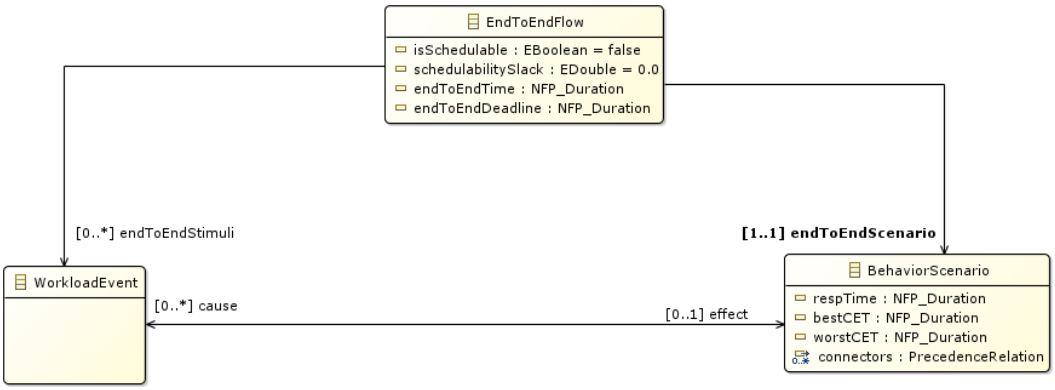

Figure 2.3: endtoendflow-diagram

This class is modeled in the Gqam Package while originally it is from the Sam MARTE subpackage. This is subject to futur modification, especially when the constraint (aka timing requirements) will be further developped.

Chapter 3

Marte package

3.1 Overview

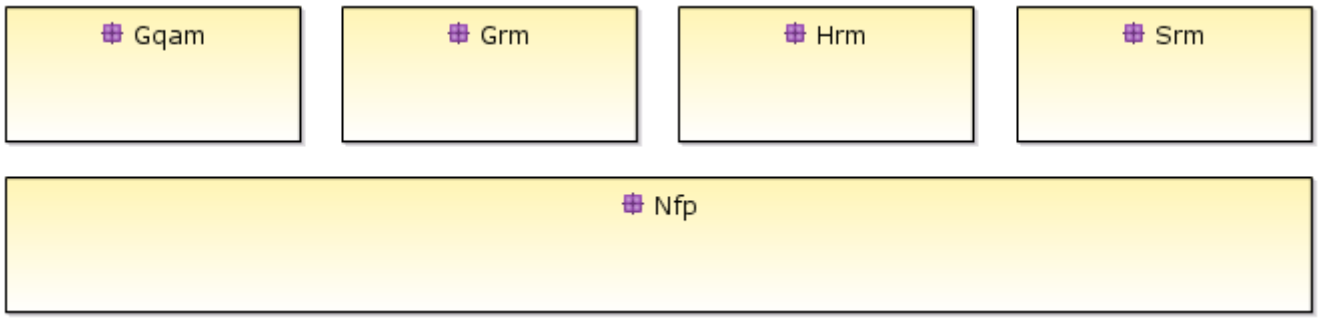

Figure 3.1: Marte-class-diagram-overview

Chapter 4

Coreelements package

4.1 Overview

coreelements-class-diagram-overview.png

Figure 4.1: coreelements-class-diagram-overview

4.2 Abstraction classifier

TODO: write an overview

4.2.1 Generalizations

- Dependency from coreelements

4.2.2 Specializations

- Allocate from alloc

4.2.3 Semantics

TODO: write a semantic

4.3 Constraint classifier

TODO: write an overview

4.3.1 Generalizations

- PackageableElement from coreelements

4.3.2 Specializations

- Constraint from annotation
- LatencyObserver from gqam
- TimedObserver from gqam
- SchedulingObserver from sam

4.3.3 Semantics

TODO: write a semantic

4.4 Dependency classifier

TODO: write an overview

4.4.1 Generalizations

- DirectedRelationship from coreelements
- PackageableElement from coreelements

4.4.2 Specializations

- Abstraction from coreelements
- Allocate from alloc

4.4.3 Semantics

TODO: write a semantic

4.5 DirectedRelationship classifier

TODO: write an overview

4.5.1 Specializations

- Abstraction from coreelements
- Dependency from coreelements
- Allocate from alloc

4.5.2 Semantics

TODO: write a semantic

4.6 ModelElement classifier

TODO: write an overview

4.6.1 Generalizations

- <<,>> from <<java.lang.Object@3bd323e9[1],invalid>>

4.6.2 Specializations

- Abstraction from coreelements
- Constraint from coreelements
- Dependency from coreelements
- NamedElement from coreelements
- Package from coreelements
- PackageableElement from coreelements
- AnnotatedElement from annotation
- ModelingConcern from annotation
- Constraint from annotation
- Allocate from alloc
- AcquireStep from gqam
- BehaviorScenario from gqam
- CommunicationChannel from gqam
- CommunicationStep from gqam
- ControlPin from gqam
- Delay from gqam
- ExecutionStep from gqam
- InputPin from gqam
- LatencyObserver from gqam
- OutputPin from gqam

[1] mailto:java.lang.Object@3bd323e9

- ReleaseStep from gqam
- RequestedService from gqam
- ResourceServiceExcecution from gqam
- Step from gqam
- TimedObserver from gqam
- WorkloadBehavior from gqam
- WorkloadEvent from gqam
- AccessControlPolicy from grm
- ClockResource from grm
- CommunicationMedia from grm
- ComputingResource from grm
- ConcurrencyResource from grm
- CommunicationResource from grm
- DeviceResource from grm
- MutualExclusionProtocol from grm
- MutualExclusionResource from grm
- ProcessingResource from grm
- ProtectionParameter from grm
- Resource from grm
- ResourceBroker from grm
- ResourceControlPolicy from grm
- ResourceInstance from grm
- ResourceInterface from grm
- ResourceManager from grm
- ResourcePackage from grm
- ResourcePackageableElement from grm
- ResourcePort from grm
- ResourceService from grm
- Scheduler from grm
- SchedulableResource from grm
- SchedulingParameter from grm

- SchedulingPolicy from grm
- SecondaryScheduler from grm
- StorageResource from grm
- SynchResource from grm
- TimingResource from grm
- TimerResource from grm
- UsageTypedAmount from grm
- FirmwareArchitecture from hrm
- HardwareActuator from hrm
- HardwareArbiter from hrm
- HardwareAsic from hrm
- HardwareBranchPredictor from hrm
- HardwareBridge from hrm
- HardwareBus from hrm
- HardwareCache from hrm
- HardwareClock from hrm
- HardwareCommunicationResource from hrm
- HardwareComputingResource from hrm
- HardwareDevice from hrm
- HardwareDma from hrm
- HardwareDrive from hrm
- HardwareInterface from hrm
- HardwareInterfacePackage from hrm
- HardwareIo from hrm
- HardwareIpBlock from hrm
- HardwareIsa from hrm
- HardwareMedia from hrm
- HardwareMemory from hrm
- HardwareMmu from hrm
- HardwarePin from hrm
- HardwarePlatform from hrm

- HardwarePld from hrm
- HardwarePort from hrm
- HardwareProcessingMemory from hrm
- HardwareProcessor from hrm
- HardwareRam from hrm
- HardwareResourcePackage from hrm
- HardwareResource from hrm
- HardwareRom from hrm
- HardwareSensor from hrm
- HardwareService from hrm
- HardwareStorageManager from hrm
- HardwareStorageMemory from hrm
- HardwareSupport from hrm
- HardwareTimingResource from hrm
- HardwareTimer from hrm
- HardwareWatchdog from hrm
- EndToEndFlow from sam
- SchedulingObserver from sam
- Alarm from srm
- DeviceBroker from srm
- InterruptResource from srm
- MemoryBroker from srm
- MemoryPartition from srm
- MessageComResource from srm
- NotificationResource from srm
- SharedDataComResource from srm
- SoftwareAccessService from srm
- SoftwareArchitecture from srm
- SoftwareCommunicationResource from srm
- SoftwareConcurrentResource from srm
- SoftwareInteractionResource from srm

- SoftwareInterface from srm
- SoftwareInterfacePackage from srm
- SoftwareMutualExclusionResource from srm
- SoftwarePort from srm
- SoftwareResource from srm
- SoftwareResourcePackage from srm
- SoftwareSchedulableResource from srm
- SoftwareScheduler from srm
- SoftwareService from srm
- SoftwareSynchronizationResource from srm
- SoftwareTimerResource from srm

4.6.3 Semantics

TODO: write a semantic

4.7 NamedElement classifier

TODO: write an overview

4.7.1 Generalizations

- <<,>> from <<java.lang.Object@3bd323e9[2],invalid>>
- ModelElement from coreelements

4.7.2 Specializations

- Abstraction from coreelements
- Constraint from coreelements
- Dependency from coreelements
- Package from coreelements
- PackageableElement from coreelements
- ModelingConcern from annotation
- Constraint from annotation

[2] mailto:java.lang.Object@3bd323e9

- Allocate from alloc
- AcquireStep from gqam
- BehaviorScenario from gqam
- CommunicationChannel from gqam
- CommunicationStep from gqam
- ControlPin from gqam
- Delay from gqam
- ExecutionStep from gqam
- InputPin from gqam
- LatencyObserver from gqam
- OutputPin from gqam
- ReleaseStep from gqam
- RequestedService from gqam
- ResourceServiceExcecution from gqam
- Step from gqam
- TimedObserver from gqam
- WorkloadBehavior from gqam
- WorkloadEvent from gqam
- AccessControlPolicy from grm
- ClockResource from grm
- CommunicationMedia from grm
- ComputingResource from grm
- ConcurrencyResource from grm
- CommunicationResource from grm
- DeviceResource from grm
- MutualExclusionProtocol from grm
- MutualExclusionResource from grm
- ProcessingResource from grm
- ProtectionParameter from grm
- Resource from grm
- ResourceBroker from grm

- ResourceControlPolicy from grm
- ResourceInstance from grm
- ResourceInterface from grm
- ResourceManager from grm
- ResourcePackage from grm
- ResourcePackageableElement from grm
- ResourcePort from grm
- ResourceService from grm
- Scheduler from grm
- SchedulableResource from grm
- SchedulingParameter from grm
- SchedulingPolicy from grm
- SecondaryScheduler from grm
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- HardwareComputingResource from hrm
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- HardwareDrive from hrm
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- SoftwareInterfacePackage from srm
- SoftwareMutualExclusionResource from srm
- SoftwarePort from srm
- SoftwareResource from srm
- SoftwareResourcePackage from srm
- SoftwareSchedulableResource from srm
- SoftwareScheduler from srm
- SoftwareService from srm
- SoftwareSynchronizationResource from srm
- SoftwareTimerResource from srm

4.7.3 Semantics

TODO: write a semantic

4.8 Package classifier

TODO: write an overview

4.8.1 Generalizations

- PackageableElement from coreelements

4.8.2 Specializations

- ResourcePackage from grm
- HardwareInterfacePackage from hrm
- HardwareResourcePackage from hrm
- SoftwareInterfacePackage from srm
- SoftwareResourcePackage from srm

4.8.3 Semantics

TODO: write a semantic

4.9 PackageableElement classifier

TODO: write an overview

4.9.1 Generalizations

- NamedElement from coreelements

4.9.2 Specializations

- Abstraction from coreelements
- Constraint from coreelements
- Dependency from coreelements
- Package from coreelements
- ModelingConcern from annotation
- Constraint from annotation
- Allocate from alloc
- CommunicationChannel from gqam
- LatencyObserver from gqam
- TimedObserver from gqam
- ClockResource from grm
- CommunicationMedia from grm
- ComputingResource from grm
- ConcurrencyResource from grm

- CommunicationResource from grm
- DeviceResource from grm
- MutualExclusionResource from grm
- ProcessingResource from grm
- Resource from grm
- ResourceBroker from grm
- ResourceInstance from grm
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- SoftwareResource from srm
- SoftwareResourcePackage from srm
- SoftwareSchedulableResource from srm
- SoftwareScheduler from srm
- SoftwareSynchronizationResource from srm
- SoftwareTimerResource from srm

4.9.3 Semantics

TODO: write a semantic

Chapter 5

Annotation package

5.1 Overview

annotation-class-diagram-overview.png

Figure 5.1: annotation-class-diagram-overview

5.2 AnnotatedElement classifier

TODO: write an overview

5.2.1 Generalizations

- ModelElement from coreelements

5.2.2 Specializations

- AcquireStep from gqam
- CommunicationStep from gqam
- Delay from gqam
- ExecutionStep from gqam
- ReleaseStep from gqam
- RequestedService from gqam
- ResourceServiceExcecution from gqam
- Step from gqam
- EndToEndFlow from sam

5.2.3 Semantics

TODO: write a semantic

5.3 AnnotatedModel classifier

TODO: write an overview

5.3.1 Semantics

TODO: write a semantic

5.4 ModelingConcern classifier

TODO: write an overview

5.4.1 Generalizations

- PackageableElement from coreelements

5.4.2 Attributes

- description: EString [0:1]

5.4.3 Semantics

TODO: write a semantic

5.5 Constraint classifier

TODO: write an overview

5.5.1 Generalizations

- Constraint from coreelements

5.5.2 Specializations

- LatencyObserver from gqam
- TimedObserver from gqam
- SchedulingObserver from sam

5.5.3 Attributes

- kind: ConstraintKind [0:1]

5.5.4 Semantics

TODO: write a semantic

5.6 ConstraintKind classifier

TODO: write an overview

5.6.1 Values

- required
- offered
- contract

5.6.2 Semantics

TODO: write a semantic

Chapter 6

Alloc package

6.1 Overview

alloc-class-diagram-overview.png

Figure 6.1: alloc-class-diagram-overview

6.2 Allocate classifier

Allocate is a dependency based on UML::Abstraction. It is a mechanism for associating elements of different types, or in different hierarchies, at an abstract level. Allocate is used for assessing user model consistency and directing future design activity. It is expected that an «allocate» relationship between model elements is a precursor to a more concrete relationship between the elements, their properties, operations, attributes, or sub-classes.

TODO: write an overview

6.2.1 Generalizations

- Abstraction from coreelements

6.2.2 Attributes

- kind: AllocationKind [0:1]This differentiates the kind of allocations, whether both allocated elements on each side are structural, behavioral, or whether this is a hybrid allocation.
- nature: AllocationNature [0:1]This identifies the purpose of the allocation, whether the allocation is equivalent to a spatial distribution, where several application model elements are distributed to different resources or whether timed elements are scheduled according to a given scheduler.

6.2.3 Semantics

TODO: write a semantic

6.3 AllocationNature classifier

TODO: write an overview

6.3.1 Values

- spatialDistribution It indicates that the suppliers are distributed on the clients. Spatial distribution is the allocation of computations to processing elements, of data to memories, and of data/control dependencies to communication resources.
- timeScheduling It indicates that the allocation consists in a temporal/behavioral ordering of the suppliers, the order being given by the clients. Scheduling is the temporal/behavioral ordering of the activities (computations, data storage movements or communication) allocated to each resource.

6.3.2 Semantics

TODO: write a semantic

6.4 AllocationKind classifier

TODO: write an overview

6.4.1 Values

- structural Indicates that the suppliers and the clients are all structural named elements.
- behavioral Indicates that the suppliers and the clients are all behavioral named elements.
- hybrid Indicates that the suppliers and the clients are not of the same kind.

6.4.2 Semantics

TODO: write a semantic

Chapter 7

Gqam package

7.1 Overview

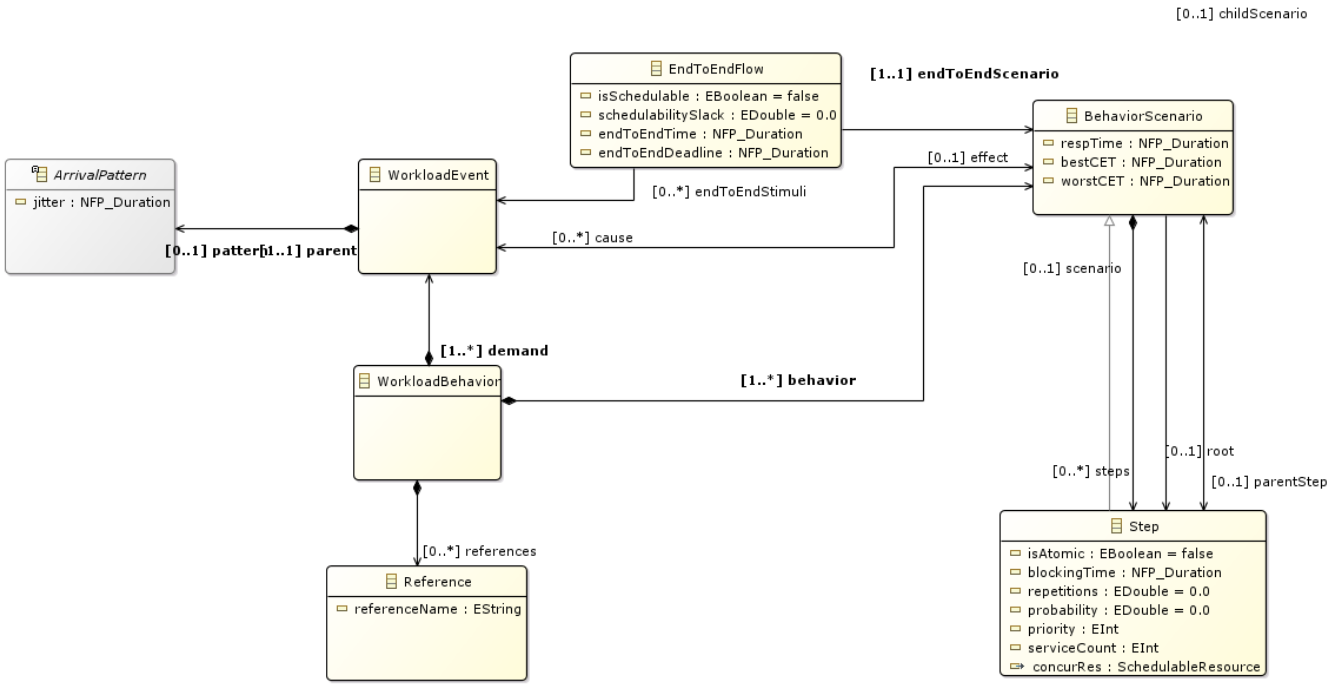


Figure 7.1: gqam-class-diagram-overview

Same as the UML 2.5 Pin with isControl=true.

7.2 AcquireStep classifier

TODO: write an overview

7.2.1 Generalizations

- Step from gqam

7.2.2 Attributes

- resUnits: EInt [0:1]

7.2.3 Semantics

TODO: write a semantic

7.3 ArrivalPattern classifier

TODO: write an overview

7.3.1 Specializations

- BurstPattern from gqam
- ClosedPattern from gqam
- Once from gqam
- PeriodicPattern from gqam
- SlidingWindowPattern from gqam
- SporadicPattern from gqam

7.3.2 Attributes

- jitter: NFP_Duration [0:1]
- phase: NFP_Duration [0:1]

7.3.3 Semantics

TODO: write a semantic

7.4 BehaviorScenario classifier

TODO: write an overview

7.4.1 Generalizations

- NamedElement from coreelements

7.4.2 Specializations

- AcquireStep from gqam
- CommunicationStep from gqam
- Delay from gqam
- ExecutionStep from gqam
- ReleaseStep from gqam
- RequestedService from gqam
- ResourceServiceExcecution from gqam
- Step from gqam

7.4.3 Attributes

- respTime: NFP_Duration [0:1]
- bestCET: NFP_Duration [0:1]
- worstCET: NFP_Duration [0:1]

7.4.4 Semantics

TODO: write a semantic

7.5 BurstPattern classifier

It describes a bursty interarrival pattern with a number of events that can occur in a bounded period.

TODO: write an overview

7.5.1 Generalizations

- ArrivalPattern from gqam

7.5.2 Attributes

- minInterarrival: NFP_Duration [1:1]The minimum interarrival duration between two successive occurrences of a burst.
- maxInterarrival: NFP_Duration [0:1]The maximum interarrival duration between two successive occurrences of a burst.
- minEventInterval: NFP_Duration [1:1]The minimum interval between two event occurrences within a burst.
- maxEventInterval: NFP_Duration [0:1]The maximum interval between two event occurrences within a burst.
- burstSize: ELong [1:1]The number of event occurrences within a burst.

7.5.3 Semantics

TODO: write a semantic

7.6 ClosedPattern classifier

This is a TupleType that contains the parameters that are necessary to specify a closed pattern. It is characterized by a fixed number of active or potential users or jobs that cycle between executing the scenario, and spending an external delay period (sometimes called “think time”) outside the system, between the end of one response and the next request.

TODO: write an overview

7.6.1 Generalizations

- ArrivalPattern from gqam

7.6.2 Attributes

- population: ELong [1:1]The size of the workload (number of system users).
- extDelay: NFP_Duration [1:1]The delay between the end of one response and the start of the next for each member of the population of system users.

7.6.3 Semantics

TODO: write a semantic

7.7 CommunicationChannel classifier

TODO: write an overview

7.7.1 Generalizations

- SchedulableResource from grm

7.7.2 Semantics

TODO: write a semantic

7.8 CommunicationStep classifier

TODO: write an overview

7.8.1 Generalizations

- Step from gqam

7.8.2 Attributes

- msgSize: NFP_DataSize [0:1]

7.8.3 Semantics

TODO: write a semantic

7.9 ConnectorKind classifier

TODO: write an overview

7.9.1 Values

- Sequence
- Branch
- Merge
- Fork
- Join

7.9.2 Semantics

TODO: write a semantic

7.10 ControlPin classifier

The concept is from UML 2.5 Pin, where isControlPin=true.

TODO: write an overview

7.10.1 Generalizations

- MultiplicityElement from gqam
- NamedElement from coreelements

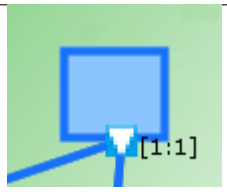
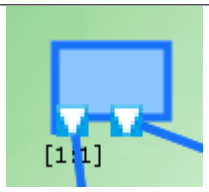
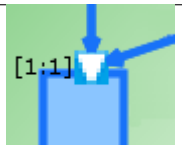
7.10.2 Specializations

- InputPin from gqam
- OutputPin from gqam

7.10.3 Semantics

The semantic is the same as per UML 2.5. It can be seen as tokens passing. The cardinality of the pin indicates how much tokens it needs for the task to be activable, and how much at maximum it will consume.

All in all, it enables to express advance activation patterns. For instance, all pattern that can be expressed with logical expressions can easily be encoded.

	AND	OR
Output		
Input		

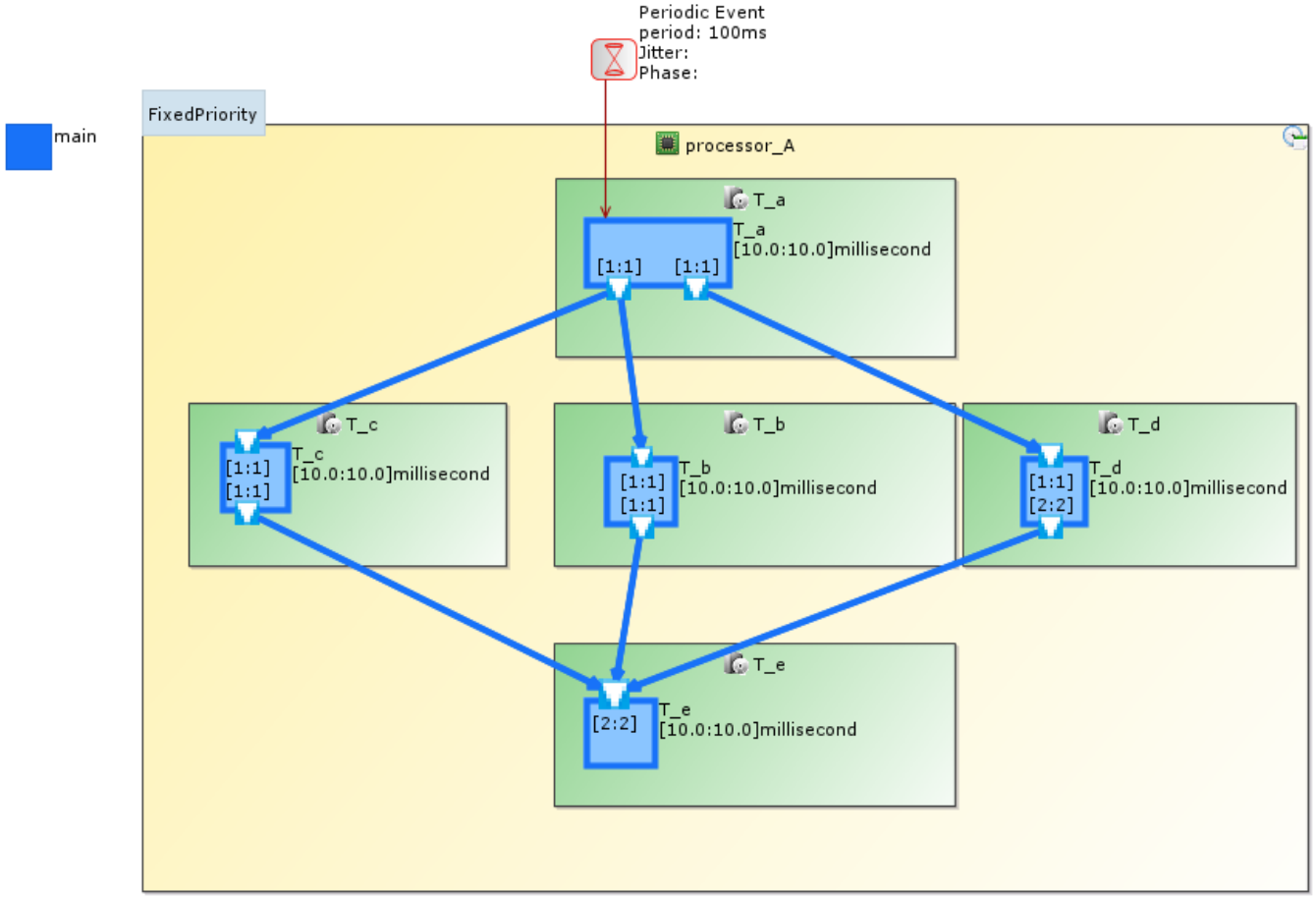


Figure 7.2: e = (b and c) or d

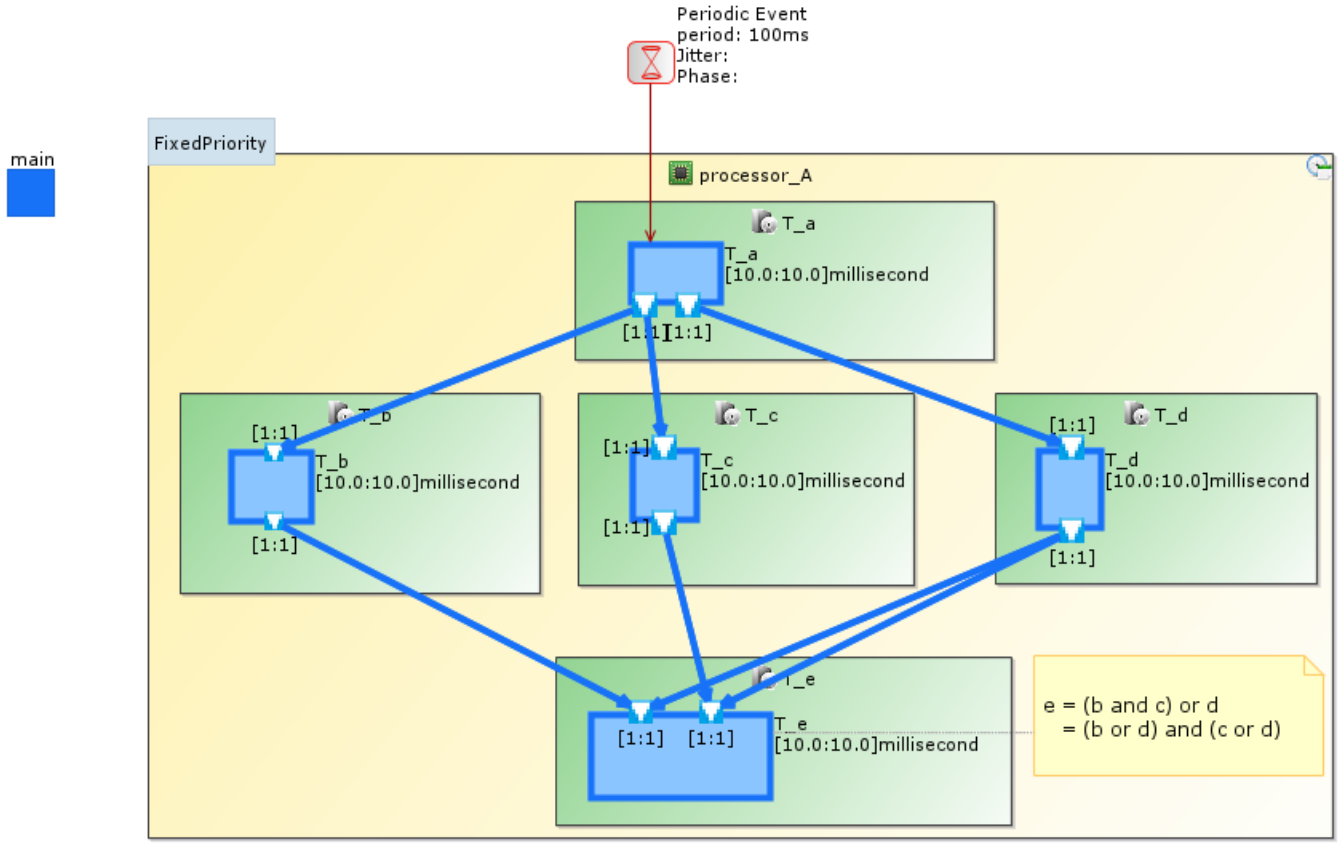


Figure 7.3: Another way of describing activation pattern based on CNF

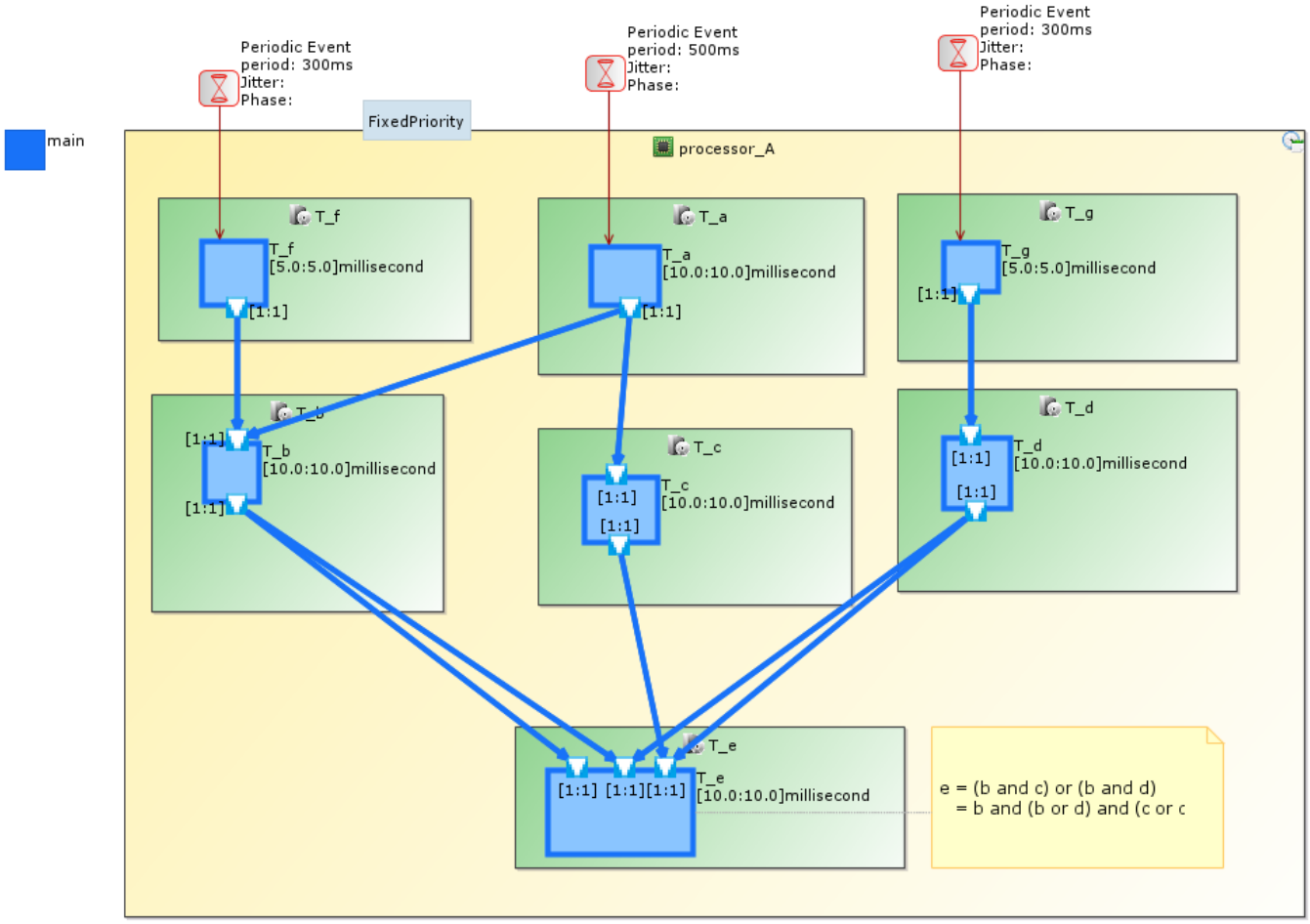


Figure 7.4: Complex pattern of activations of the task T_E

Figure 7.4 illustrates a pattern activation that could be expressed with a logical expression. For ease of encoding, it needs to be rewritten in conjunctive normal form (CNF).

7.11 Delay classifier

A special kind of Step that just introduce a delay without any resource consumption.

TODO: write an overview

7.11.1 Generalizations

- Step from gqam

7.11.2 Attributes

- duration: NFP_Duration [1:1]

7.11.3 Semantics

TODO: write a semantic

7.12 ExecutionStep classifier

TODO: write an overview

7.12.1 Generalizations

- Step from gqam

7.12.2 Semantics

TODO: write a semantic

7.13 InputPin classifier

from UML 2.5

TODO: write an overview

7.13.1 Generalizations

- ControlPin from gqam

7.13.2 Semantics

TODO: write a semantic

7.14 LatencyObserver classifier

TODO: write an overview

7.14.1 Generalizations

- TimedObserver from gqam

7.14.2 Attributes

- latency: NFP_Duration [0:1]
- missRatio: EDouble [0:1]
- maxJitter: NFP_Duration [0:1]

7.14.3 Semantics

TODO: write a semantic

7.15 LaxityKind classifier

TODO: write an overview

7.15.1 Values

- undef
- hard
- soft
- other

7.15.2 Semantics

TODO: write a semantic

7.16 MultiplicityElement classifier

from UML 2.5

TODO: write an overview

7.16.1 Specializations

- ControlPin from gqam
- InputPin from gqam
- OutputPin from gqam

7.16.2 Attributes

- lowerBound: EInt [1:1]
- upperBound: EInt [1:1]

7.16.3 Semantics

TODO: write a semantic

7.17 NFP_DataSize classifier

TODO: write an overview

See org.polarsys.time4sys.marte.nfp.DataSize.

TODO: write a semantic

7.18 NFP_Duration classifier

TODO: write an overview

See org.polarsys.time4sys.marte.nfp.Duration.

TODO: write a semantic

7.19 Once classifier

TODO: write an overview

7.19.1 Generalizations

- ArrivalPattern from gqam

7.19.2 Semantics

TODO: write a semantic

7.20 OutputPin classifier

from UML 2.5

TODO: write an overview

7.20.1 Generalizations

- ControlPin from gqam

7.20.2 Semantics

TODO: write a semantic

7.21 PeriodicPattern classifier

It describes periodic interarrival patterns, with an optional maximal deviation (jitter).

TODO: write an overview

7.21.1 Generalizations

- ArrivalPattern from gqam

7.21.2 Attributes

- period: NFP_Duration [0:1]
- occurences: EInt [0:1]

7.21.3 Semantics

TODO: write a semantic

7.22 PrecedenceRelation classifier

This is to be deprecated by ports usage.

TODO: write an overview

7.22.1 Attributes

- connectorKind: ConnectorKind [0:1]

7.22.2 Semantics

TODO: write a semantic

7.23 Reference classifier

TODO: write an overview

7.23.1 Attributes

- referenceName: EString [0:1]

7.23.2 Semantics

TODO: write a semantic

7.24 ReleaseStep classifier

TODO: write an overview

7.24.1 Generalizations

- Step from gqam

7.24.2 Attributes

- resUnits: EInt [0:1]

7.24.3 Semantics

TODO: write a semantic

7.25 RequestedService classifier

TODO: write an overview

7.25.1 Generalizations

- Step from gqam

7.25.2 Semantics

TODO: write a semantic

7.26 ResourceServiceExcecution classifier

TODO: write an overview

7.26.1 Generalizations

- Step from gqam

7.26.2 Semantics

TODO: write a semantic

7.27 SlidingWindowPattern classifier

TODO: write an overview

7.27.1 Generalizations

- ArrivalPattern from gqam

7.27.2 Attributes

- windowSize: NFP_Duration [1:1]
- nbEvents: ELong [0:1]

7.27.3 Semantics

TODO: write a semantic

7.28 SporadicPattern classifier

It describes a bounded pattern that is defined by a corner case interarrival times and a maximum deviation (jitter).

TODO: write an overview

7.28.1 Generalizations

- ArrivalPattern from gqam

7.28.2 Attributes

- minInterarrival: NFP_Duration [0:1]
- maxInterarrival: NFP_Duration [0:1]

7.28.3 Semantics

TODO: write a semantic

7.29 Step classifier

TODO: write an overview

7.29.1 Generalizations

- BehaviorScenario from gqam
- AnnotatedElement from annotation

7.29.2 Specializations

- AcquireStep from gqam
- CommunicationStep from gqam
- Delay from gqam
- ExecutionStep from gqam
- ReleaseStep from gqam
- RequestedService from gqam
- ResourceServiceExcecution from gqam

7.29.3 Attributes

- isAtomic: EBoolean [0:1]
- blockingTime: NFP_Duration [0:1]
- repetitions: EDouble [0:1]
- probability: EDouble [0:1]
- priority: EInt [0:1]The higher the value of the priority, the higher the urgency of the step.
- serviceCount: EInt [0:1]

7.29.4 Semantics

TODO: write a semantic

7.30 TimedObserver classifier

TODO: write an overview

7.30.1 Generalizations

- Constraint from annotation

7.30.2 Specializations

- LatencyObserver from gqam
- SchedulingObserver from sam

7.30.3 Attributes

- laxity: LaxityKind [0:-1]

7.30.4 Semantics

TODO: write a semantic

7.31 WorkloadBehavior classifier

TODO: write an overview

7.31.1 Generalizations

- NamedElement from coreelements

7.31.2 Semantics

TODO: write a semantic

7.32 WorkloadEvent classifier

TODO: write an overview

7.32.1 Generalizations

- NamedElement from coreelements

7.32.2 Semantics

TODO: write a semantic

Chapter 8

Grm package

8.1 Overview

grm-class-diagram-overview.png

Figure 8.1: grm-class-diagram-overview

8.2 AccessControlPolicy classifier

TODO: write an overview

8.2.1 Generalizations

- NamedElement from coreelements

8.2.2 Specializations

- MutualExclusionProtocol from grm
- SchedulingPolicy from grm

8.2.3 Semantics

TODO: write a semantic

8.3 ClockResource classifier

TODO: write an overview

8.3.1 Generalizations

- TimingResource from grm

8.3.2 Semantics

TODO: write a semantic

8.4 CommunicationEndPoint classifier

TODO: write an overview

8.4.1 Specializations

- ResourcePort from grm
- HardwarePort from hrm
- MessageComResource from srm
- NotificationResource from srm
- SharedDataComResource from srm
- SoftwareCommunicationResource from srm
- SoftwareInteractionResource from srm
- SoftwareMutualExclusionResource from srm
- SoftwarePort from srm
- SoftwareSynchronizationResource from srm

8.4.2 Attributes

- packetSize: EInt [0:1]

8.4.3 Semantics

TODO: write a semantic

8.5 CommunicationMedia classifier

TODO: write an overview

8.5.1 Generalizations

- CommunicationResource from grm
- ProcessingResource from grm

8.5.2 Specializations

- MessageComResource from srm
- SharedDataComResource from srm
- SoftwareCommunicationResource from srm

8.5.3 Attributes

- elementSize: NFP_DataSize [0:1]
- capacity: NFP_DataTxRate [0:1]
- packetTime: NFP_Duration [0:1]
- blockingTime: NFP_Duration [0:1]
- transmMode: TransmModeKind [0:1]

8.5.4 Semantics

TODO: write a semantic

8.6 ComputingResource classifier

TODO: write an overview

8.6.1 Generalizations

- ProcessingResource from grm

8.6.2 Specializations

- HardwareAsic from hrm
- HardwareComputingResource from hrm
- HardwarePld from hrm
- HardwareProcessor from hrm

8.6.3 Semantics

TODO: write a semantic

8.7 ConcurrencyResource classifier

TODO: write an overview

8.7.1 Generalizations

- Resource from grm

8.7.2 Specializations

- CommunicationChannel from gqam
- SchedulableResource from grm
- Alarm from srm
- InterruptResource from srm
- SoftwareConcurrentResource from srm
- SoftwareSchedulableResource from srm

8.7.3 Semantics

TODO: write a semantic

8.8 CommunicationResource classifier

TODO: write an overview

8.8.1 Generalizations

- Resource from grm

8.8.2 Specializations

- CommunicationMedia from grm
- HardwareArbiter from hrm
- HardwareBridge from hrm
- HardwareBus from hrm
- HardwareCommunicationResource from hrm
- HardwareDma from hrm
- HardwareMedia from hrm
- MessageComResource from srm
- SharedDataComResource from srm
- SoftwareCommunicationResource from srm

8.8.3 Semantics

TODO: write a semantic

8.9 DeviceResource classifier

TODO: write an overview

8.9.1 Generalizations

- ProcessingResource from grm

8.9.2 Specializations

- HardwareActuator from hrm
- HardwareDevice from hrm
- HardwareIo from hrm
- HardwareSensor from hrm
- HardwareSupport from hrm

8.9.3 Semantics

TODO: write a semantic

8.10 DynamicUsage classifier

TODO: write an overview

8.10.1 Generalizations

- ResourceUsage from grm

8.10.2 Semantics

TODO: write a semantic

8.11 MutualExclusionProtocol classifier

TODO: write an overview

8.11.1 Generalizations

- AccessControlPolicy from grm

8.11.2 Attributes

- protocol: ProtectProtocolKind [0:1]
- otherProtocol: EString [0:1]

8.11.3 Semantics

TODO: write a semantic

8.12 MutualExclusionResource classifier

TODO: write an overview

8.12.1 Generalizations

- SynchResource from grm

8.12.2 Specializations

- SoftwareMutualExclusionResource from srm

8.12.3 Semantics

TODO: write a semantic

8.13 ProcessingResource classifier

TODO: write an overview

8.13.1 Generalizations

- Resource from grm

8.13.2 Specializations

- CommunicationMedia from grm
- ComputingResource from grm
- DeviceResource from grm
- HardwareActuator from hrm
- HardwareAsic from hrm
- HardwareComputingResource from hrm
- HardwareDevice from hrm
- HardwareIo from hrm
- HardwarePld from hrm
- HardwareProcessor from hrm
- HardwareSensor from hrm
- HardwareSupport from hrm
- MessageComResource from srm
- SharedDataComResource from srm
- SoftwareCommunicationResource from srm

8.13.3 Attributes

- speedFactor: EFloat [0:1]

8.13.4 Semantics

TODO: write a semantic

8.14 ProtectionParameter classifier

TODO: write an overview

8.14.1 Generalizations

- NamedElement from coreelements

8.14.2 Attributes

- priorityCeiling: EInt [0:1]
- preemptionLevel: EInt [0:1]

8.14.3 Semantics

TODO: write a semantic

8.15 ProtectProtocolKind classifier

TODO: write an overview

8.15.1 Values

- FIFO
- NoPreemption
- PriorityCeiling
- PriorityInheritance
- StackBased
- Undef
- Other

8.15.2 Semantics

TODO: write a semantic

8.16 Resource classifier

TODO: write an overview

8.16.1 Generalizations

- ResourcePackageableElement from grm

8.16.2 Specializations

- CommunicationChannel from gqam
- ClockResource from grm
- CommunicationMedia from grm
- ComputingResource from grm
- ConcurrencyResource from grm
- CommunicationResource from grm

- DeviceResource from grm
- MutualExclusionResource from grm
- ProcessingResource from grm
- ResourceBroker from grm
- ResourceManager from grm
- Scheduler from grm
- SchedulableResource from grm
- SecondaryScheduler from grm
- StorageResource from grm
- SynchResource from grm
- TimingResource from grm
- TimerResource from grm
- UsageTypedAmount from grm
- FirmwareArchitecture from hrm
- HardwareActuator from hrm
- HardwareArbiter from hrm
- HardwareAsic from hrm
- HardwareBranchPredictor from hrm
- HardwareBridge from hrm
- HardwareBus from hrm
- HardwareCache from hrm
- HardwareClock from hrm
- HardwareCommunicationResource from hrm
- HardwareComputingResource from hrm
- HardwareDevice from hrm
- HardwareDma from hrm
- HardwareDrive from hrm
- HardwareIo from hrm
- HardwareIpBlock from hrm
- HardwareIsa from hrm
- HardwareMedia from hrm

- HardwareMemory from hrm
- HardwareMmu from hrm
- HardwarePlatform from hrm
- HardwarePld from hrm
- HardwareProcessingMemory from hrm
- HardwareProcessor from hrm
- HardwareRam from hrm
- HardwareResource from hrm
- HardwareRom from hrm
- HardwareSensor from hrm
- HardwareStorageManager from hrm
- HardwareStorageMemory from hrm
- HardwareSupport from hrm
- HardwareTimingResource from hrm
- HardwareTimer from hrm
- HardwareWatchdog from hrm
- Alarm from srm
- DeviceBroker from srm
- InterruptResource from srm
- MemoryBroker from srm
- MemoryPartition from srm
- MessageComResource from srm
- NotificationResource from srm
- SharedDataComResource from srm
- SoftwareArchitecture from srm
- SoftwareCommunicationResource from srm
- SoftwareConcurrentResource from srm
- SoftwareInteractionResource from srm
- SoftwareMutualExclusionResource from srm
- SoftwareResource from srm
- SoftwareSchedulableResource from srm

- SoftwareScheduler from srm
- SoftwareSynchronizationResource from srm
- SoftwareTimerResource from srm

8.16.3 Attributes

- resMult: EInt [0:1]
- isProtected: EBoolean [0:1]
- isActive: EBoolean [0:1]

8.16.4 Semantics

TODO: write a semantic

8.17 ResourceBroker classifier

TODO: write an overview

8.17.1 Generalizations

- Resource from grm

8.17.2 Specializations

- Scheduler from grm
- SecondaryScheduler from grm
- HardwareArbiter from hrm
- HardwareDma from hrm
- HardwareMmu from hrm
- HardwareStorageManager from hrm
- DeviceBroker from srm
- MemoryBroker from srm
- SoftwareScheduler from srm

8.17.3 Semantics

TODO: write a semantic

8.18 ResourceConnector classifier

TODO: write an overview

8.18.1 Specializations

- HardwareConnector from hrm
- SoftwareConnector from srm

8.18.2 Semantics

TODO: write a semantic

8.19 ResourceControlPolicy classifier

TODO: write an overview

8.19.1 Generalizations

- NamedElement from coreelements

8.19.2 Semantics

TODO: write a semantic

8.20 ResourceInstance classifier

TODO: write an overview

8.20.1 Generalizations

- ResourcePackageableElement from grm

8.20.2 Semantics

TODO: write a semantic

8.21 ResourceInterface classifier

TODO: write an overview

8.21.1 Generalizations

- ResourcePackageableElement from grm

8.21.2 Specializations

- HardwareInterface from hrm
- SoftwareInterface from srm

8.21.3 Semantics

TODO: write a semantic

8.22 ResourceManager classifier

TODO: write an overview

8.22.1 Generalizations

- Resource from grm

8.22.2 Specializations

- Alarm from srm
- DeviceBroker from srm
- InterruptResource from srm
- MemoryBroker from srm
- MemoryPartition from srm
- MessageComResource from srm
- NotificationResource from srm
- SharedDataComResource from srm
- SoftwareArchitecture from srm
- SoftwareCommunicationResource from srm
- SoftwareConcurrentResource from srm
- SoftwareInteractionResource from srm
- SoftwareMutualExclusionResource from srm
- SoftwareResource from srm
- SoftwareSchedulableResource from srm
- SoftwareSynchronizationResource from srm

8.22.3 Semantics

TODO: write a semantic

8.23 ResourcePackage classifier

Deprecated. Use CoreElements::Package

TODO: write an overview

8.23.1 Generalizations

- Package from coreelements

8.23.2 Specializations

- HardwareInterfacePackage from hrm
- HardwareResourcePackage from hrm
- SoftwareInterfacePackage from srm
- SoftwareResourcePackage from srm

8.23.3 Semantics

TODO: write a semantic

8.24 ResourcePackageableElement classifier

Deprecated. Use CoreElements::PackageElement

TODO: write an overview

8.24.1 Generalizations

- PackageableElement from coreelements

8.24.2 Specializations

- CommunicationChannel from gqam
- ClockResource from grm
- CommunicationMedia from grm
- ComputingResource from grm
- ConcurrencyResource from grm

- CommunicationResource from grm
- DeviceResource from grm
- MutualExclusionResource from grm
- ProcessingResource from grm
- Resource from grm
- ResourceBroker from grm
- ResourceInstance from grm
- ResourceInterface from grm
- ResourceManager from grm
- Scheduler from grm
- SchedulableResource from grm
- SecondaryScheduler from grm
- StorageResource from grm
- SynchResource from grm
- TimingResource from grm
- TimerResource from grm
- UsageTypedAmount from grm
- FirmwareArchitecture from hrm
- HardwareActuator from hrm
- HardwareArbiter from hrm
- HardwareAsic from hrm
- HardwareBranchPredictor from hrm
- HardwareBridge from hrm
- HardwareBus from hrm
- HardwareCache from hrm
- HardwareClock from hrm
- HardwareCommunicationResource from hrm
- HardwareComputingResource from hrm
- HardwareDevice from hrm
- HardwareDma from hrm
- HardwareDrive from hrm

- HardwareInterface from hrm
- HardwareIo from hrm
- HardwareIpBlock from hrm
- HardwareIsa from hrm
- HardwareMedia from hrm
- HardwareMemory from hrm
- HardwareMmu from hrm
- HardwarePlatform from hrm
- HardwarePld from hrm
- HardwareProcessingMemory from hrm
- HardwareProcessor from hrm
- HardwareRam from hrm
- HardwareResource from hrm
- HardwareRom from hrm
- HardwareSensor from hrm
- HardwareStorageManager from hrm
- HardwareStorageMemory from hrm
- HardwareSupport from hrm
- HardwareTimingResource from hrm
- HardwareTimer from hrm
- HardwareWatchdog from hrm
- Alarm from srm
- DeviceBroker from srm
- InterruptResource from srm
- MemoryBroker from srm
- MemoryPartition from srm
- MessageComResource from srm
- NotificationResource from srm
- SharedDataComResource from srm
- SoftwareArchitecture from srm
- SoftwareCommunicationResource from srm

- SoftwareConcurrentResource from srm
- SoftwareInteractionResource from srm
- SoftwareInterface from srm
- SoftwareMutualExclusionResource from srm
- SoftwareResource from srm
- SoftwareSchedulableResource from srm
- SoftwareScheduler from srm
- SoftwareSynchronizationResource from srm
- SoftwareTimerResource from srm

8.24.3 Semantics

TODO: write a semantic

8.25 ResourcePort classifier

TODO: write an overview

8.25.1 Generalizations

- CommunicationEndPoint from grm
- NamedElement from coreelements

8.25.2 Specializations

- HardwarePort from hrm
- SoftwarePort from srm

8.25.3 Semantics

TODO: write a semantic

8.26 ResourceService classifier

TODO: write an overview

8.26.1 Generalizations

- NamedElement from coreelements

8.26.2 Specializations

- HardwareService from hrm
- SoftwareAccessService from srm
- SoftwareService from srm

8.26.3 Semantics

TODO: write a semantic

8.27 ResourceUsage classifier

TODO: write an overview

8.27.1 Specializations

- DynamicUsage from grm
- StaticUsage from grm

8.27.2 Semantics

TODO: write a semantic

8.28 SchedPolicyKind classifier

TODO: write an overview

8.28.1 Values

- Undef
- EarliestDeadlineFirst
- FIFO
- FixedPriority
- LeastLaxityFirst
- RoundRobin
- TimeTableDriven
- Other

8.28.2 Semantics

TODO: write a semantic

8.29 Scheduler classifier

TODO: write an overview

8.29.1 Generalizations

- ResourceBroker from grm

8.29.2 Specializations

- SecondaryScheduler from grm
- SoftwareScheduler from srm

8.29.3 Semantics

TODO: write a semantic

8.30 SchedulableResource classifier

TODO: write an overview

8.30.1 Generalizations

- ConcurrencyResource from grm

8.30.2 Specializations

- CommunicationChannel from gqam
- SoftwareSchedulableResource from srm

8.30.3 Semantics

TODO: write a semantic

8.31 SchedulingParameter classifier

TODO: write an overview

8.31.1 Generalizations

- NamedElement from coreelements

8.31.2 Attributes

- value: EString [0:1]

8.31.3 Semantics

TODO: write a semantic

8.32 SchedulingPolicy classifier

TODO: write an overview

8.32.1 Generalizations

- AccessControlPolicy from grm

8.32.2 Attributes

- policy: SchedPolicyKind [0:1]
- otherSchedPolicy: EString [0:1]

8.32.3 Semantics

TODO: write a semantic

8.33 SecondaryScheduler classifier

TODO: write an overview

8.33.1 Generalizations

- Scheduler from grm

8.33.2 Semantics

TODO: write a semantic

8.34 StaticUsage classifier

TODO: write an overview

8.34.1 Generalizations

- ResourceUsage from grm

8.34.2 Semantics

TODO: write a semantic

8.35 StorageResource classifier

TODO: write an overview

8.35.1 Generalizations

- Resource from grm

8.35.2 Specializations

- HardwareCache from hrm
- HardwareDrive from hrm
- HardwareMemory from hrm
- HardwareProcessingMemory from hrm
- HardwareRam from hrm
- HardwareRom from hrm
- HardwareStorageMemory from hrm

8.35.3 Semantics

TODO: write a semantic

8.36 SynchResource classifier

TODO: write an overview

8.36.1 Generalizations

- Resource from grm

8.36.2 Specializations

- MutualExclusionResource from grm
- NotificationResource from srm
- SoftwareMutualExclusionResource from srm
- SoftwareSynchronizationResource from srm

8.36.3 Semantics

TODO: write a semantic

8.37 TimingResource classifier

TODO: write an overview

8.37.1 Generalizations

- Resource from grm

8.37.2 Specializations

- ClockResource from grm
- TimerResource from grm
- HardwareClock from hrm
- HardwareTimingResource from hrm
- HardwareTimer from hrm
- HardwareWatchdog from hrm
- SoftwareTimerResource from srm

8.37.3 Semantics

TODO: write a semantic

8.38 TimerResource classifier

TODO: write an overview

8.38.1 Generalizations

- TimingResource from grm

8.38.2 Specializations

- SoftwareTimerResource from srm

8.38.3 Attributes

- duration: NFP_Duration [0:1]
- isPeriodic: EBoolean [0:1]

8.38.4 Semantics

TODO: write a semantic

8.39 TransmModeKind classifier

TODO: write an overview

8.39.1 Values

- simplex
- half_duplex
- full_duplex

8.39.2 Semantics

TODO: write a semantic

8.40 UsageDemand classifier

TODO: write an overview

8.40.1 Attributes

- event: EString [0:1]

8.40.2 Semantics

TODO: write a semantic

8.41 UsageTypedAmount classifier

TODO: write an overview

8.41.1 Generalizations

- Resource from grm

8.41.2 Attributes

- execTime: EInt [0:1]
- msgSize: EInt [0:1]
- allocatedmemory: EInt [0:1]
- usedMemory: EInt [0:1]
- powerPeak: EInt [0:1]
- energy: EInt [0:1]

8.41.3 Semantics

TODO: write a semantic

8.42 NFP_Duration classifier

TODO: write an overview

See org.polarsys.time4sys.marte.nfp.Duration.

TODO: write a semantic

8.43 NFP_DataSize classifier

TODO: write an overview

See org.polarsys.time4sys.marte.nfp.DataSize.

TODO: write a semantic

8.44 NFP_DataTxRate classifier

TODO: write an overview

See org.polarsys.time4sys.marte.nfp.DataTxRate.

TODO: write a semantic

Chapter 9

Hrm package

9.1 Overview

hrm-class-diagram-overview.png

Figure 9.1: hrm-class-diagram-overview

9.2 CacheType classifier

TODO: write an overview

9.2.1 Values

- data
- instruction
- unified
- other
- undef

9.2.2 Semantics

TODO: write a semantic

9.3 ComponentState classifier

TODO: write an overview

9.3.1 Values

- operating
- storage
- other
- undef

9.3.2 Semantics

TODO: write a semantic

9.4 ConditionType classifier

TODO: write an overview

9.4.1 Values

- temperature
- humidity
- altitude
- vibration
- shock
- other
- undef

9.4.2 Semantics

TODO: write a semantic

9.5 Direction classifier

TODO: write an overview

9.5.1 Values

- in
- out
- inout

9.5.2 Semantics

TODO: write a semantic

9.6 EnvCondition classifier

TODO: write an overview

9.6.1 Attributes

- type: ConditionType [0:1]
- status: ComponentState [0:1]
- description: EString [0:1]
- range: EInt [0:1]

9.6.2 Semantics

TODO: write a semantic

9.7 FirmwareArchitecture classifier

TODO: write an overview

9.7.1 Generalizations

- HardwareResource from hrm

9.7.2 Semantics

TODO: write a semantic

9.8 IsaType classifier

TODO: write an overview

9.8.1 Values

- risc
- cisc
- vliw

- simd
- mimd
- other
- undef

9.8.2 Semantics

TODO: write a semantic

9.9 HardwareActuator classifier

TODO: write an overview

9.9.1 Generalizations

- HardwareIo from hrm

9.9.2 Semantics

TODO: write a semantic

9.10 HardwareArbiter classifier

TODO: write an overview

9.10.1 Generalizations

- HardwareCommunicationResource from hrm
- ResourceBroker from grm

9.10.2 Specializations

- HardwareDma from hrm

9.10.3 Semantics

TODO: write a semantic

9.11 HardwareAsic classifier

TODO: write an overview

9.11.1 Generalizations

- HardwareComputingResource from hrm

9.11.2 Semantics

TODO: write a semantic

9.12 HardwareBranchPredictor classifier

TODO: write an overview

9.12.1 Generalizations

- HardwareResource from hrm

9.12.2 Semantics

TODO: write a semantic

9.13 HardwareBridge classifier

TODO: write an overview

9.13.1 Generalizations

- HardwareMedia from hrm

9.13.2 Semantics

TODO: write a semantic

9.14 HardwareBus classifier

TODO: write an overview

9.14.1 Generalizations

- HardwareMedia from hrm

9.14.2 Attributes

- addressWidth: EInt [0:1]
- wordWidth: EInt [0:1]
- isSynchronous: EBoolean [0:1]
- isSerial: EBoolean [0:1]

9.14.3 Semantics

TODO: write a semantic

9.15 HardwareCache classifier

TODO: write an overview

9.15.1 Generalizations

- HardwareProcessingMemory from hrm

9.15.2 Attributes

- level: EInt [0:1]
- type: CacheType [0:1]
- nbSets: EInt [0:1]
- blockSize: EInt [0:1]
- associativity: EInt [0:1]

9.15.3 Semantics

TODO: write a semantic

9.16 HardwareCard classifier

TODO: write an overview

9.16.1 Generalizations

- HardwareComponent from hrm

9.16.2 Specializations

- HardwarePlatform from hrm

9.16.3 Semantics

TODO: write a semantic

9.17 HardwareChannel classifier

TODO: write an overview

9.17.1 Generalizations

- HardwareComponent from hrm

9.17.2 Specializations

- HardwareArbiter from hrm
- HardwareBridge from hrm
- HardwareBus from hrm
- HardwareCommunicationResource from hrm
- HardwareDma from hrm
- HardwareMedia from hrm

9.17.3 Attributes

- nbWires: EInt [0:1]

9.17.4 Semantics

TODO: write a semantic

9.18 HardwareChip classifier

TODO: write an overview

9.18.1 Generalizations

- HardwareComponent from hrm

9.18.2 Specializations

- HardwareActuator from hrm
- HardwareAsic from hrm
- HardwareCache from hrm
- HardwareClock from hrm
- HardwareComputingResource from hrm
- HardwareDevice from hrm
- HardwareDma from hrm
- HardwareDrive from hrm
- HardwareIo from hrm
- HardwareMemory from hrm
- HardwareMmu from hrm
- HardwarePld from hrm
- HardwareProcessingMemory from hrm
- HardwareProcessor from hrm
- HardwareRam from hrm
- HardwareRom from hrm
- HardwareSensor from hrm
- HardwareStorageManager from hrm
- HardwareStorageMemory from hrm
- HardwareSupport from hrm
- HardwareTimingResource from hrm
- HardwareTimer from hrm
- HardwareWatchdog from hrm

9.18.3 Attributes

- technology: EInt [0:1]

9.18.4 Semantics

TODO: write a semantic

9.19 HardwareClock classifier

TODO: write an overview

9.19.1 Generalizations

- HardwareTimingResource from hrm

9.19.2 Attributes

- frequency: EInt [0:1]

9.19.3 Semantics

TODO: write a semantic

9.20 HardwareCommunicationResource classifier

TODO: write an overview

9.20.1 Generalizations

- CommunicationResource from grm
- HardwareResource from hrm
- HardwareChannel from hrm

9.20.2 Specializations

- HardwareArbiter from hrm
- HardwareBridge from hrm
- HardwareBus from hrm
- HardwareDma from hrm
- HardwareMedia from hrm

9.20.3 Semantics

TODO: write a semantic

9.21 HardwareComponent classifier

TODO: write an overview

9.21.1 Specializations

- HardwareActuator from hrm
- HardwareArbiter from hrm
- HardwareAsic from hrm
- HardwareBridge from hrm
- HardwareBus from hrm
- HardwareCache from hrm
- HardwareCard from hrm
- HardwareChannel from hrm
- HardwareChip from hrm
- HardwareClock from hrm
- HardwareCommunicationResource from hrm
- HardwareComputingResource from hrm
- HardwareDevice from hrm
- HardwareDma from hrm
- HardwareDrive from hrm
- HardwareIo from hrm
- HardwareMedia from hrm
- HardwareMemory from hrm
- HardwareMmu from hrm
- HardwarePlatform from hrm
- HardwarePld from hrm
- HardwarePort from hrm
- HardwareProcessingMemory from hrm
- HardwareProcessor from hrm
- HardwareRam from hrm
- HardwareRom from hrm
- HardwareSensor from hrm
- HardwareStorageManager from hrm
- HardwareStorageMemory from hrm
- HardwareSupport from hrm

- HardwareTimingResource from hrm
- HardwareTimer from hrm
- HardwareWatchdog from hrm

9.21.2 Attributes

- dimension: EInt [0:1]
- area: EInt [0:1]
- posX: EInt [0:1]
- posY: EInt [0:1]
- grid: EInt [0:1]
- nbPins: EInt [0:1]
- weight: EInt [0:1]
- price: EInt [0:1]

9.21.3 Semantics

TODO: write a semantic

9.22 HardwareComputingResource classifier

TODO: write an overview

9.22.1 Generalizations

- ComputingResource from grm
- HardwareResource from hrm
- HardwareChip from hrm

9.22.2 Specializations

- HardwareAsic from hrm
- HardwarePld from hrm
- HardwareProcessor from hrm

9.22.3 Attributes

- opFrequencies: EInt [0:1]

9.22.4 Semantics

TODO: write a semantic

9.23 HardwareConnector classifier

TODO: write an overview

9.23.1 Generalizations

- ResourceConnector from grm

9.23.2 Semantics

TODO: write a semantic

9.24 HardwareDevice classifier

TODO: write an overview

9.24.1 Generalizations

- DeviceResource from grm
- HardwareResource from hrm
- HardwareChip from hrm

9.24.2 Specializations

- HardwareActuator from hrm
- HardwareIo from hrm
- HardwareSensor from hrm
- HardwareSupport from hrm

9.24.3 Semantics

TODO: write a semantic

9.25 HardwareDma classifier

TODO: write an overview

9.25.1 Generalizations

- HardwareStorageManager from hrm
- HardwareArbiter from hrm

9.25.2 Attributes

- nbChannels: EInt [0:1]
- transferWidth: EInt [0:1]

9.25.3 Semantics

TODO: write a semantic

9.26 HardwareDrive classifier

TODO: write an overview

9.26.1 Generalizations

- HardwareStorageMemory from hrm

9.26.2 Attributes

- sectorSize: EInt [0:1]

9.26.3 Semantics

TODO: write a semantic

9.27 HardwareInterface classifier

TODO: write an overview

9.27.1 Generalizations

- ResourceInterface from grm

9.27.2 Semantics

TODO: write a semantic

9.28 HardwareInterfacePackage classifier

TODO: write an overview

9.28.1 Generalizations

- ResourcePackage from grm

9.28.2 Semantics

TODO: write a semantic

9.29 HardwareIo classifier

TODO: write an overview

9.29.1 Generalizations

- HardwareDevice from hrm

9.29.2 Specializations

- HardwareActuator from hrm
- HardwareSensor from hrm

9.29.3 Semantics

TODO: write a semantic

9.30 HardwareIpBlock classifier

TODO: write an overview

9.30.1 Generalizations

- HardwareResource from hrm

9.30.2 Semantics

TODO: write a semantic

9.31 HardwareIsa classifier

TODO: write an overview

9.31.1 Generalizations

- HardwareResource from hrm

9.31.2 Attributes

- family: EString [0:1]
- instWidth: EInt [0:1]
- type: IsaType [0:1]

9.31.3 Semantics

TODO: write a semantic

9.32 HardwareMedia classifier

TODO: write an overview

9.32.1 Generalizations

- HardwareCommunicationResource from hrm

9.32.2 Specializations

- HardwareBridge from hrm
- HardwareBus from hrm

9.32.3 Semantics

TODO: write a semantic

9.33 HardwareMemory classifier

TODO: write an overview

9.33.1 Generalizations

- StorageResource from grm
- HardwareResource from hrm
- HardwareChip from hrm

9.33.2 Specializations

- HardwareCache from hrm
- HardwareDrive from hrm
- HardwareProcessingMemory from hrm
- HardwareRam from hrm
- HardwareRom from hrm
- HardwareStorageMemory from hrm

9.33.3 Attributes

- memorySize: EInt [0:1]
- addressSize: EInt [0:1]
- timings: EInt [0:-1]
- throughput: EInt [0:1]

9.33.4 Semantics

TODO: write a semantic

9.34 HardwareMmu classifier

TODO: write an overview

9.34.1 Generalizations

- HardwareStorageManager from hrm

9.34.2 Attributes

- virtualAddrSpace: EInt [0:1]
- physicalAddrSpace: EInt [0:1]
- memoryProtection: EBoolean [0:1]
- nbEntriesTlb: EInt [0:1]

9.34.3 Semantics

TODO: write a semantic

9.35 HardwarePin classifier

TODO: write an overview

9.35.1 Generalizations

- NamedElement from coreelements

9.35.2 Attributes

- width: EInt [0:1]
- direction: Direction [0:1]

9.35.3 Semantics

TODO: write a semantic

9.36 HardwarePlatform classifier

TODO: write an overview

9.36.1 Generalizations

- HardwareResource from hrm
- HardwareCard from hrm

9.36.2 Semantics

TODO: write a semantic

9.37 HardwarePld classifier

TODO: write an overview

9.37.1 Generalizations

- HardwareComputingResource from hrm

9.37.2 Attributes

- pldTechnology: PldTechnology [0:1]
- nbRows: EInt [0:1]
- nbColumns: EInt [0:1]
- kind: PldClass [0:1]
- nbLuts: EInt [0:1]
- nbLutInputs: EInt [0:1]
- nbFlipFlops: EInt [0:1]

9.37.3 Semantics

TODO: write a semantic

9.38 HardwarePort classifier

TODO: write an overview

9.38.1 Generalizations

- ResourcePort from grm
- HardwareComponent from hrm

9.38.2 Attributes

- type: PortType [0:1]

9.38.3 Semantics

TODO: write a semantic

9.39 HardwareProcessingMemory classifier

TODO: write an overview

9.39.1 Generalizations

- HardwareMemory from hrm

9.39.2 Specializations

- HardwareCache from hrm
- HardwareRam from hrm

9.39.3 Attributes

- replPolicy: ReplPolicy [0:1]
- writePolicy: WritePolicy [0:1]

9.39.4 Semantics

TODO: write a semantic

9.40 HardwareProcessor classifier

TODO: write an overview

9.40.1 Generalizations

- HardwareComputingResource from hrm

9.40.2 Attributes

- architecture: EInt [0:1]
- mips: EInt [0:1]
- ipc: EFloat [0:1]
- nbCores: EInt [0:1]
- nbPipelines: EInt [0:1]
- nbStages: EInt [0:1]
- nbAlus: EInt [0:1]
- nbFpus: EInt [0:1]

9.40.3 Semantics

TODO: write a semantic

9.41 HardwareRam classifier

TODO: write an overview

9.41.1 Generalizations

- HardwareProcessingMemory from hrm

9.41.2 Attributes

- nbRows: EInt [0:1]
- nbColumns: EInt [0:1]
- nbBanks: EInt [0:1]
- wordSize: EInt [0:1]
- isSynchronous: EBoolean [0:1]
- isStatic: EBoolean [0:1]
- isNonVolatile: EBoolean [0:1]

9.41.3 Semantics

TODO: write a semantic

9.42 HardwareResourcePackage classifier

TODO: write an overview

9.42.1 Generalizations

- ResourcePackage from grm

9.42.2 Semantics

TODO: write a semantic

9.43 HardwareResource classifier

TODO: write an overview

9.43.1 Generalizations

- Resource from grm

9.43.2 Specializations

- FirmwareArchitecture from hrm
- HardwareActuator from hrm
- HardwareArbiter from hrm
- HardwareAsic from hrm
- HardwareBranchPredictor from hrm
- HardwareBridge from hrm
- HardwareBus from hrm
- HardwareCache from hrm
- HardwareClock from hrm
- HardwareCommunicationResource from hrm
- HardwareComputingResource from hrm
- HardwareDevice from hrm
- HardwareDma from hrm
- HardwareDrive from hrm
- HardwareIo from hrm
- HardwareIpBlock from hrm
- HardwareIsa from hrm
- HardwareMedia from hrm
- HardwareMemory from hrm
- HardwarePlatform from hrm
- HardwarePld from hrm
- HardwareProcessingMemory from hrm
- HardwareProcessor from hrm
- HardwareRam from hrm
- HardwareRom from hrm
- HardwareSensor from hrm
- HardwareStorageMemory from hrm
- HardwareSupport from hrm
- HardwareTimingResource from hrm
- HardwareTimer from hrm
- HardwareWatchdog from hrm

9.43.3 Semantics

TODO: write a semantic

9.44 HardwareRom classifier

TODO: write an overview

9.44.1 Generalizations

- HardwareStorageMemory from hrm

9.44.2 Attributes

- type: RomType [0:1]
- nbRows: EInt [0:1]
- nbColumns: EInt [0:1]
- nbBanks: EInt [0:1]
- wordSize: EInt [0:1]

9.44.3 Semantics

TODO: write a semantic

9.45 HardwareSensor classifier

TODO: write an overview

9.45.1 Generalizations

- HardwareIo from hrm

9.45.2 Semantics

TODO: write a semantic

9.46 HardwareService classifier

TODO: write an overview

9.46.1 Generalizations

- ResourceService from grm

9.46.2 Semantics

TODO: write a semantic

9.47 HardwareStorageManager classifier

TODO: write an overview

9.47.1 Generalizations

- ResourceBroker from grm
- HardwareChip from hrm

9.47.2 Specializations

- HardwareDma from hrm
- HardwareMmu from hrm

9.47.3 Semantics

TODO: write a semantic

9.48 HardwareStorageMemory classifier

TODO: write an overview

9.48.1 Generalizations

- HardwareMemory from hrm

9.48.2 Specializations

- HardwareDrive from hrm
- HardwareRom from hrm

9.48.3 Semantics

TODO: write a semantic

9.49 HardwareSupport classifier

TODO: write an overview

9.49.1 Generalizations

- HardwareDevice from hrm

9.49.2 Semantics

TODO: write a semantic

9.50 HardwareTimingResource classifier

TODO: write an overview

9.50.1 Generalizations

- HardwareResource from hrm
- TimingResource from grm
- HardwareChip from hrm

9.50.2 Specializations

- HardwareClock from hrm
- HardwareTimer from hrm
- HardwareWatchdog from hrm

9.50.3 Semantics

TODO: write a semantic

9.51 HardwareTimer classifier

TODO: write an overview

9.51.1 Generalizations

- HardwareTimingResource from hrm

9.51.2 Specializations

- HardwareWatchdog from hrm

9.51.3 Semantics

TODO: write a semantic

9.52 HardwareWatchdog classifier

TODO: write an overview

9.52.1 Generalizations

- HardwareTimer from hrm

9.52.2 Semantics

TODO: write a semantic

9.53 HardwareWire classifier

TODO: write an overview

9.53.1 Semantics

TODO: write a semantic

9.54 PldTechnology classifier

TODO: write an overview

9.54.1 Values

- sram
- antifuse
- flash
- other
- undef

9.54.2 Semantics

TODO: write a semantic

9.55 PldClass classifier

TODO: write an overview

9.55.1 Values

- symetricalArray
- rowBased
- seaOfGates
- hierarchicalPld
- other
- undef

9.55.2 Semantics

TODO: write a semantic

9.56 PortType classifier

TODO: write an overview

9.56.1 Values

- male
- female
- other
- undef

9.56.2 Semantics

TODO: write a semantic

9.57 ReplPolicy classifier

TODO: write an overview

9.57.1 Values

- lru
- nfu
- fifo
- random
- other
- undef

9.57.2 Semantics

TODO: write a semantic

9.58 RomType classifier

TODO: write an overview

9.58.1 Values

- maskedRom
- eprom
- otpEprom
- eeprom
- flash
- other
- undef

9.58.2 Semantics

TODO: write a semantic

9.59 WritePolicy classifier

TODO: write an overview

9.59.1 Values

- writeBack
- writeThrough
- other
- undef

9.59.2 Semantics

TODO: write a semantic

Chapter 10

Nfp package

10.1 Overview

nfp-class-diagram-overview.png

Figure 10.1: nfp-class-diagram-overview

10.2 Duration classifier

TODO: write an overview

10.2.1 Specializations

- ProbabilisticDuration from nfp
- DiscreteDistribution from nfp
- NormalDistribution from nfp
- GeneralizedExtremeValueDistribution from nfp
- UniformDistribution from nfp
- CompositeDistribution from nfp

10.2.2 Attributes

- value: EDouble [0:1]
- unit: TimeUnitKind [1:1]
- best: EDouble [0:1]
- worst: EDouble [0:1]
- clock: EString [0:1]
- precision: EDouble [0:1]

10.2.3 Semantics

TODO: write a semantic

10.3 TimeUnitKind classifier

TODO: write an overview

10.3.1 Values

- ps
- ns
- us
- ms
- s
- mn
- h
- d

10.3.2 Semantics

TODO: write a semantic

10.4 TimeInterval classifier

TODO: write an overview

10.4.1 Specializations

- ProbabilisticDuration from nfp
- DiscreteDistribution from nfp
- NormalDistribution from nfp
- GeneralizedExtremeValueDistribution from nfp
- UniformDistribution from nfp
- CompositeDistribution from nfp

10.4.2 Attributes

- minOpen: EBoolean [1:1]
- maxOpen: EBoolean [1:1]

10.4.3 Semantics

TODO: write a semantic

10.5 DataSizeUnitKind classifier

TODO: write an overview

10.5.1 Values

- BIT
- BYTE
- KB
- MB
- GB

10.5.2 Semantics

TODO: write a semantic

10.6 DataSize classifier

TODO: write an overview

10.6.1 Attributes

- value: EDouble [0:1]
- unit: DataSizeUnitKind [1:1]

10.6.2 Semantics

TODO: write a semantic

10.7 ProbabilisticDuration classifier

TODO: write an overview

10.7.1 Generalizations

- TimeInterval from nfp
- Duration from nfp

10.7.2 Specializations

- DiscreteDistribution from nfp
- NormalDistribution from nfp
- GeneralizedExtremeValueDistribution from nfp
- UniformDistribution from nfp
- CompositeDistribution from nfp

10.7.3 Semantics

TODO: write a semantic

10.8 DiscreteDistribution classifier

TODO: write an overview

10.8.1 Generalizations

- ProbabilisticDuration from nfp

10.8.2 Semantics

TODO: write a semantic

10.9 Bucket classifier

TODO: write an overview

10.9.1 Attributes

- probability: EDouble [1:1]
- value: NFP_Duration [1:1]

10.9.2 Semantics

TODO: write a semantic

10.10 NormalDistribution classifier

TODO: write an overview

10.10.1 Generalizations

- ProbabilisticDuration from nfp

10.10.2 Attributes

- mu: NFP_Duration [1:1]
- sigma: NFP_Duration [1:1]

10.10.3 Semantics

TODO: write a semantic

10.11 NFP_Duration classifier

TODO: write an overview

See org.polarsys.time4sys.marte.nfp.Duration.

TODO: write a semantic

10.12 GeneralizedExtremeValueDistribution classifier

TODO: write an overview

10.12.1 Generalizations

- ProbabilisticDuration from nfp

10.12.2 Attributes

- mu: NFP_Duration [1:1]
- sigma: NFP_Duration [1:1]
- xi: NFP_Duration [1:1]

10.12.3 Semantics

TODO: write a semantic

10.13 UniformDistribution classifier

TODO: write an overview

10.13.1 Generalizations

- ProbabilisticDuration from nfp

10.13.2 Semantics

TODO: write a semantic

10.14 CompositeDistribution classifier

TODO: write an overview

10.14.1 Generalizations

- ProbabilisticDuration from nfp

10.14.2 Semantics

TODO: write a semantic

10.15 DataTxRateUnitKind classifier

TODO: write an overview

10.15.1 Values

- B_PER_S
- KB_PER_S
- MB_PER_S

10.15.2 Semantics

TODO: write a semantic

10.16 DataTxRate classifier

TODO: write an overview

10.16.1 Attributes

- value: EDouble [0:1]
- unit: DataTxRateUnitKind [1:1]

10.16.2 Semantics

TODO: write a semantic

Chapter 11

Sam package

11.1 Overview

sam-class-diagram-overview.png

Figure 11.1: sam-class-diagram-overview

11.2 EndToEndFlow classifier

End-to-end flows describe a unit of processing work in the analyzed system, which contend for use of the processing resources. This is a conceptual entity only, which is represented by its concrete elements: end-to-end stimuli and end-to- end response.

TODO: write an overview

11.2.1 Generalizations

- NamedElement from coreelements
- AnnotatedElement from annotation

11.2.2 Attributes

- isSchedulable: EBoolean [0:1]
- schedulabilitySlack: EDouble [0:1]
- endToEndTime: NFP_Duration [0:1]
- endToEndDeadline: NFP_Duration [0:1]

11.2.3 Semantics

TODO: write a semantic

11.3 NFP_Duration classifier

TODO: write an overview

See org.polarsys.time4sys.marte.nfp.Duration.

TODO: write a semantic

11.4 SchedulingObserver classifier

TODO: write an overview

11.4.1 Generalizations

- TimedObserver from gqam

11.4.2 Attributes

- suspensions: NFP_Duration [0:1]
- blockingTime: NFP_Duration [0:1]
- overlaps: NFP_Duration [0:1]

11.4.3 Semantics

TODO: write a semantic

Chapter 12

Srm package

12.1 Overview

srm-class-diagram-overview.png

Figure 12.1: srm-class-diagram-overview

12.2 AccessPolicyKind classifier

TODO: write an overview

12.2.1 Values

- Read
- Write
- ReadWrite
- Undef
- Other

12.2.2 Semantics

TODO: write a semantic

12.3 Alarm classifier

TODO: write an overview

12.3.1 Generalizations

- InterruptResource from srm

12.3.2 Attributes

- isWatchdog: EBoolean [0:1]

12.3.3 Semantics

TODO: write a semantic

12.4 ConcurrentAccesProtocolKind classifier

TODO: write an overview

12.4.1 Values

- PCP
- PIP
- NoPreemption
- Undef
- Other

12.4.2 Semantics

TODO: write a semantic

12.5 DeviceBroker classifier

TODO: write an overview

12.5.1 Generalizations

- ResourceBroker from grm
- SoftwareResource from srm

12.5.2 Attributes

- accessPolicy: AccessPolicyKind [0:1]
- isBuffered: EBoolean [0:1]

12.5.3 Semantics

TODO: write a semantic

12.6 InterruptKind classifier

TODO: write an overview

12.6.1 Values

- HardwareInterruption
- ProcessorDetectedException
- ProgrammedException
- Undef
- Other

12.6.2 Semantics

TODO: write a semantic

12.7 QueuePolicyKind classifier

TODO: write an overview

12.7.1 Values

- FIFO
- LIFO
- Priority
- Undef
- Other

12.7.2 Semantics

TODO: write a semantic

12.8 InterruptResource classifier

TODO: write an overview

12.8.1 Generalizations

- SoftwareConcurrentResource from srm

12.8.2 Specializations

- Alarm from srm

12.8.3 Attributes

- kind: InterruptKind [1:1]
- isMaskable: EBoolean [1:1]
- maskElements: EString [0:-1]
- vectorElements: EString [0:-1]
- isrEntryPoints: EString [0:-1]

12.8.4 Semantics

TODO: write a semantic

12.9 MemoryBroker classifier

TODO: write an overview

12.9.1 Generalizations

- ResourceBroker from grm
- SoftwareResource from srm

12.9.2 Attributes

- accessPolicy: AccessPolicyKind [0:1]
- memoryBlockAddressElements: EString [0:-1]
- memoryBlockSizeElements: EString [0:-1]

12.9.3 Semantics

TODO: write a semantic

12.10 MemoryPartition classifier

TODO: write an overview

12.10.1 Generalizations

- SoftwareResource from srm

12.10.2 Semantics

TODO: write a semantic

12.11 MessageComResource classifier

TODO: write an overview

12.11.1 Generalizations

- SoftwareCommunicationResource from srm

12.11.2 Attributes

- isFixedMessageSize: EBoolean [1:1]
- messageSizeElements: EString [0:-1]
- mechanism: MessageResourceKind [0:1]
- messageQueuePolicy: QueuePolicyKind [0:1]
- messageQueueCapacityElements: EString [0:-1]

12.11.3 Semantics

TODO: write a semantic

12.12 MessageResourceKind classifier

TODO: write an overview

12.12.1 Values

- MessageQueue
- Pipe
- Blackboard
- Undef
- Other

12.12.2 Semantics

TODO: write a semantic

12.13 MutualExclusionResourceKind classifier

TODO: write an overview

12.13.1 Values

- BooleanSemaphore
- CountSemaphore
- Mutex
- Undef
- Other

12.13.2 Semantics

TODO: write a semantic

12.14 NotificationResource classifier

TODO: write an overview

12.14.1 Generalizations

- SoftwareSynchronizationResource from srm

12.14.2 Attributes

- policy: OccurencePolicyKind [1:1]
- mechanism: NotificationResourceKind [1:1]
- occurenceCountElements: EString [0:-1]
- maskElements: EString [0:-1]

12.14.3 Semantics

TODO: write a semantic

12.15 NotificationResourceKind classifier

TODO: write an overview

12.15.1 Values

- Barrier
- Event
- Undef
- Other

12.15.2 Semantics

TODO: write a semantic

12.16 OccurencePolicyKind classifier

TODO: write an overview

12.16.1 Values

- Memorized
- Bounded
- Memoryless
- Undef
- Other

12.16.2 Semantics

TODO: write a semantic

12.17 SharedDataComResource classifier

TODO: write an overview

12.17.1 Generalizations

- SoftwareCommunicationResource from srm

12.17.2 Semantics

TODO: write a semantic

12.18 SoftwareAccessService classifier

TODO: write an overview

12.18.1 Generalizations

- ResourceService from grm

12.18.2 Attributes

- isModifier: EBoolean [0:1]
- accessedElement: EString [0:1]

12.18.3 Semantics

TODO: write a semantic

12.19 SoftwareArchitecture classifier

TODO: write an overview

12.19.1 Generalizations

- SoftwareResource from srm

12.19.2 Semantics

TODO: write a semantic

12.20 SoftwareCommunicationResource classifier

TODO: write an overview

12.20.1 Generalizations

- SoftwareInteractionResource from srm
- CommunicationMedia from grm

12.20.2 Specializations

- MessageComResource from srm
- SharedDataComResource from srm

12.20.3 Semantics

TODO: write a semantic

12.21 SoftwareConcurrentResource classifier

TODO: write an overview

12.21.1 Generalizations

- SoftwareResource from srm
- ConcurrencyResource from grm

12.21.2 Specializations

- Alarm from srm
- InterruptResource from srm
- SoftwareSchedulableResource from srm

12.21.3 Attributes

- periodElements: EString [0:-1]
- activationCapacity: EInt [0:1]
- priorityElements: EString [0:-1]
- stackSizeElements: EString [0:-1]
- heapSizeElements: EString [0:-1]
- entryPoints: EString [0:-1]
- arrivalPattern: EString [0:1]

12.21.4 Semantics

TODO: write a semantic

12.22 SoftwareConnector classifier

TODO: write an overview

12.22.1 Generalizations

- ResourceConnector from grm

12.22.2 Semantics

TODO: write a semantic

12.23 SoftwareInteractionResource classifier

TODO: write an overview

12.23.1 Generalizations

- CommunicationEndPoint from grm
- SoftwareResource from srm

12.23.2 Specializations

- MessageComResource from srm
- NotificationResource from srm
- SharedDataComResource from srm
- SoftwareCommunicationResource from srm
- SoftwareMutualExclusionResource from srm
- SoftwareSynchronizationResource from srm

12.23.3 Attributes

- isIntraMemoryPartitionInteraction: EBoolean [1:1]
- waitingQueuePolicy: QueuePolicyKind [0:1]
- waitingQueueCapacity: EInt [0:1]
- waitingPolicyElements: EString [0:-1]

12.23.4 Semantics

TODO: write a semantic

12.24 SoftwareInterface classifier

TODO: write an overview

12.24.1 Generalizations

- ResourceInterface from grm

12.24.2 Semantics

TODO: write a semantic

12.25 SoftwareInterfacePackage classifier

TODO: write an overview

12.25.1 Generalizations

- ResourcePackage from grm

12.25.2 Semantics

TODO: write a semantic

12.26 SoftwareMutualExclusionResource classifier

TODO: write an overview

12.26.1 Generalizations

- SoftwareSynchronizationResource from srm
- MutualExclusionResource from grm

12.26.2 Attributes

- concurrentAccessProtocol: ConcurrentAccesProtocolKind [0:1]
- mechanism: MutualExclusionResourceKind [0:1]

12.26.3 Semantics

TODO: write a semantic

12.27 SoftwarePort classifier

TODO: write an overview

12.27.1 Generalizations

- ResourcePort from grm

12.27.2 Semantics

TODO: write a semantic

12.28 SoftwareResource classifier

TODO: write an overview

12.28.1 Generalizations

- ResourceManager from grm

12.28.2 Specializations

- Alarm from srm
- DeviceBroker from srm
- InterruptResource from srm
- MemoryBroker from srm
- MemoryPartition from srm
- MessageComResource from srm
- NotificationResource from srm
- SharedDataComResource from srm
- SoftwareArchitecture from srm
- SoftwareCommunicationResource from srm
- SoftwareConcurrentResource from srm
- SoftwareInteractionResource from srm
- SoftwareMutualExclusionResource from srm
- SoftwareSchedulableResource from srm
- SoftwareSynchronizationResource from srm

12.28.3 Attributes

- memorySizeFootprint: EInt [0:1]
- stateElements: EString [0:-1]
- identifierElements: EString [0:-1]

12.28.4 Semantics

TODO: write a semantic

12.29 SoftwareResourcePackage classifier

TODO: write an overview

12.29.1 Generalizations

- ResourcePackage from grm

12.29.2 Semantics

TODO: write a semantic

12.30 SoftwareSchedulableResource classifier

TODO: write an overview

12.30.1 Generalizations

- SchedulableResource from grm
- SoftwareConcurrentResource from srm

12.30.2 Attributes

- isStaticSchedulingFeature: EBoolean [1:1]
- isPreemptable: EBoolean [1:1]
- deadlineElements: EString [0:-1]
- deadlineTypeElements: EString [0:-1]
- timeSliceElements: EString [0:-1]

12.30.3 Semantics

TODO: write a semantic

12.31 SoftwareScheduler classifier

TODO: write an overview

12.31.1 Generalizations

- Scheduler from grm

12.31.2 Semantics

TODO: write a semantic

12.32 SoftwareService classifier

TODO: write an overview

12.32.1 Generalizations

- ResourceService from grm

12.32.2 Semantics

TODO: write a semantic

12.33 SoftwareSynchronizationResource classifier

TODO: write an overview

12.33.1 Generalizations

- SoftwareInteractionResource from srm
- SynchResource from grm

12.33.2 Specializations

- NotificationResource from srm
- SoftwareMutualExclusionResource from srm

12.33.3 Semantics

TODO: write a semantic

12.34 SoftwareTimerResource classifier

TODO: write an overview

12.34.1 Generalizations

- TimerResource from grm

12.34.2 Attributes

- durationElements: EString [0:-1]

12.34.3 Semantics

TODO: write a semantic

12.35 NFP_Duration classifier

TODO: write an overview

See org.polarsys.time4sys.marte.nfp.Duration.

TODO: write a semantic