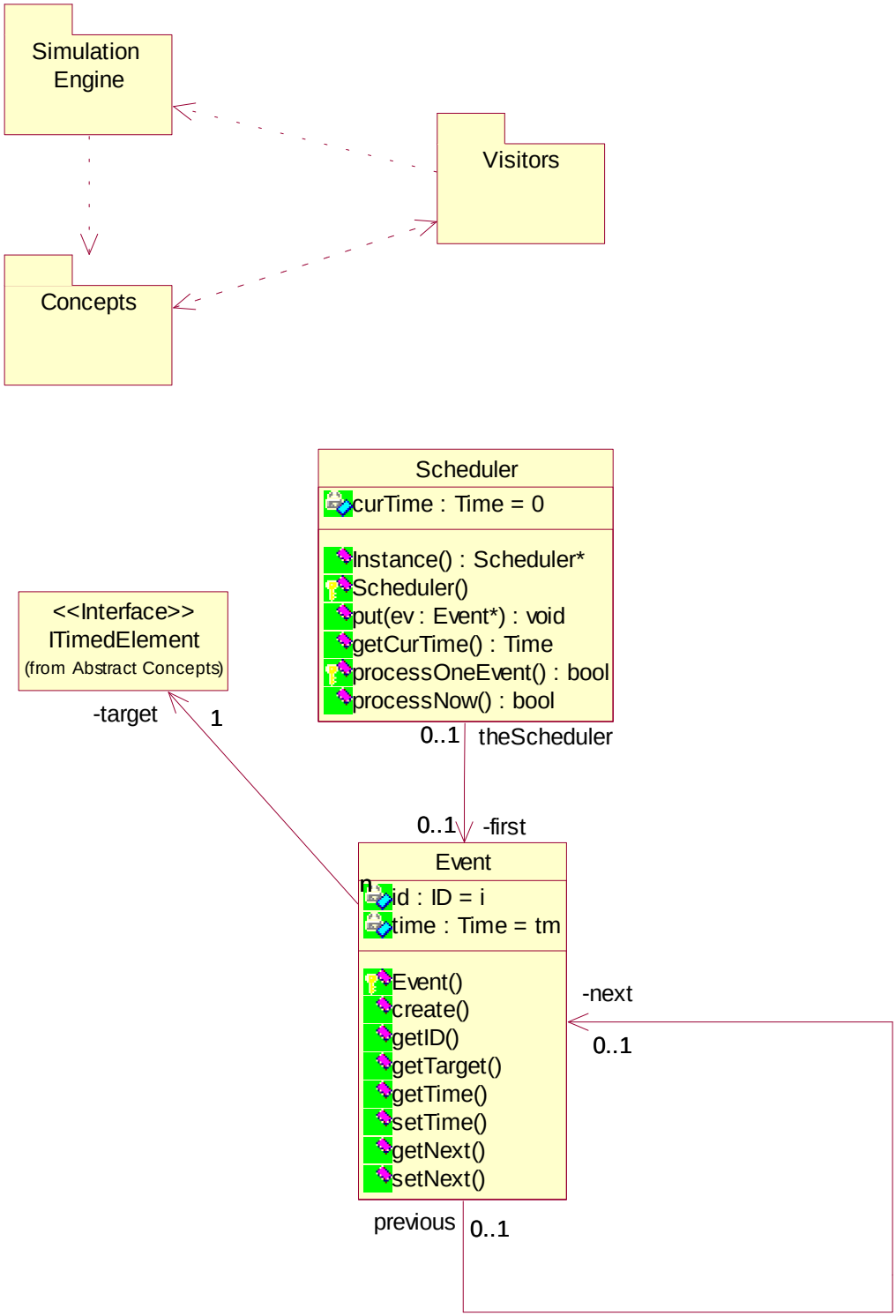
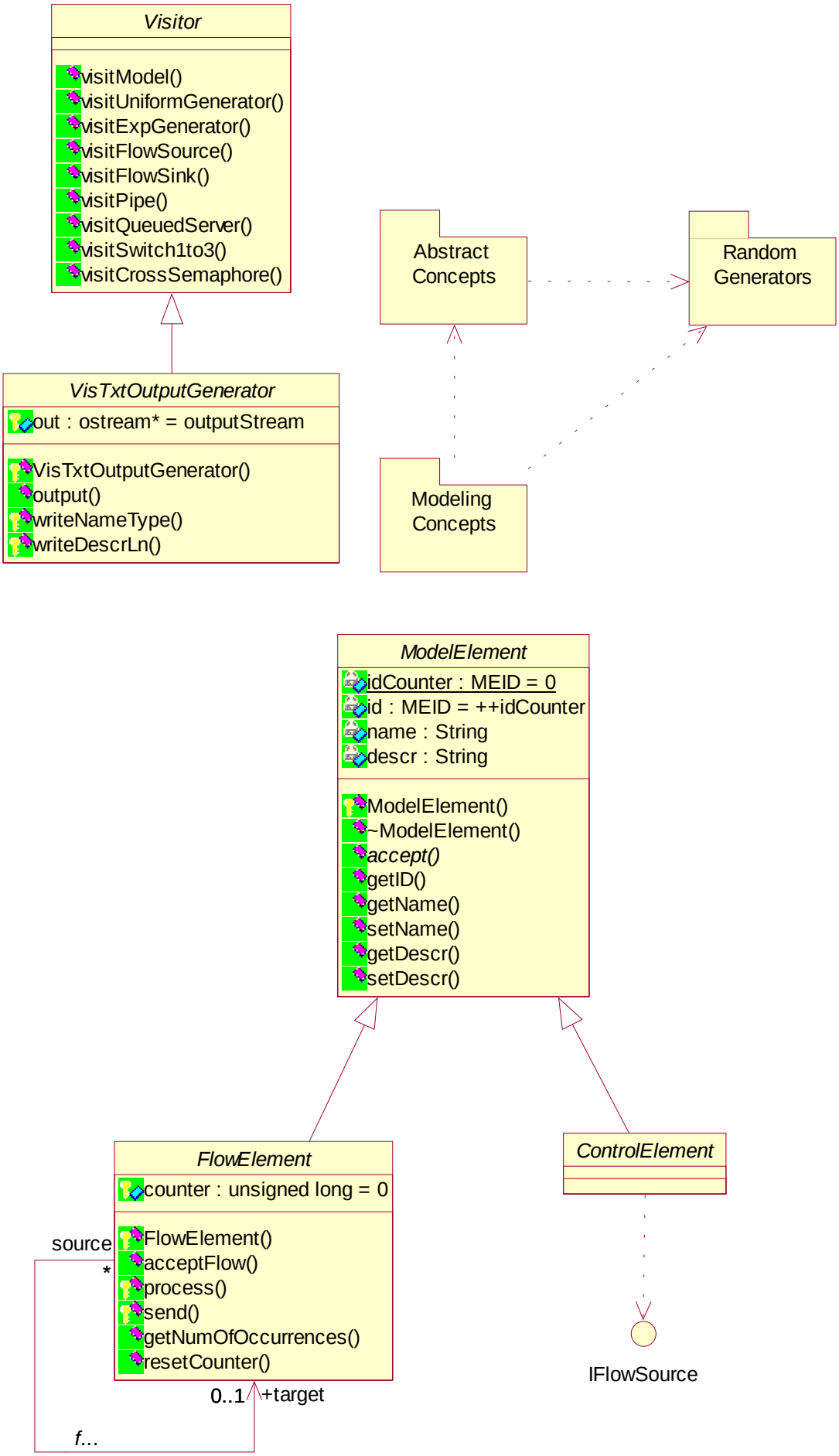
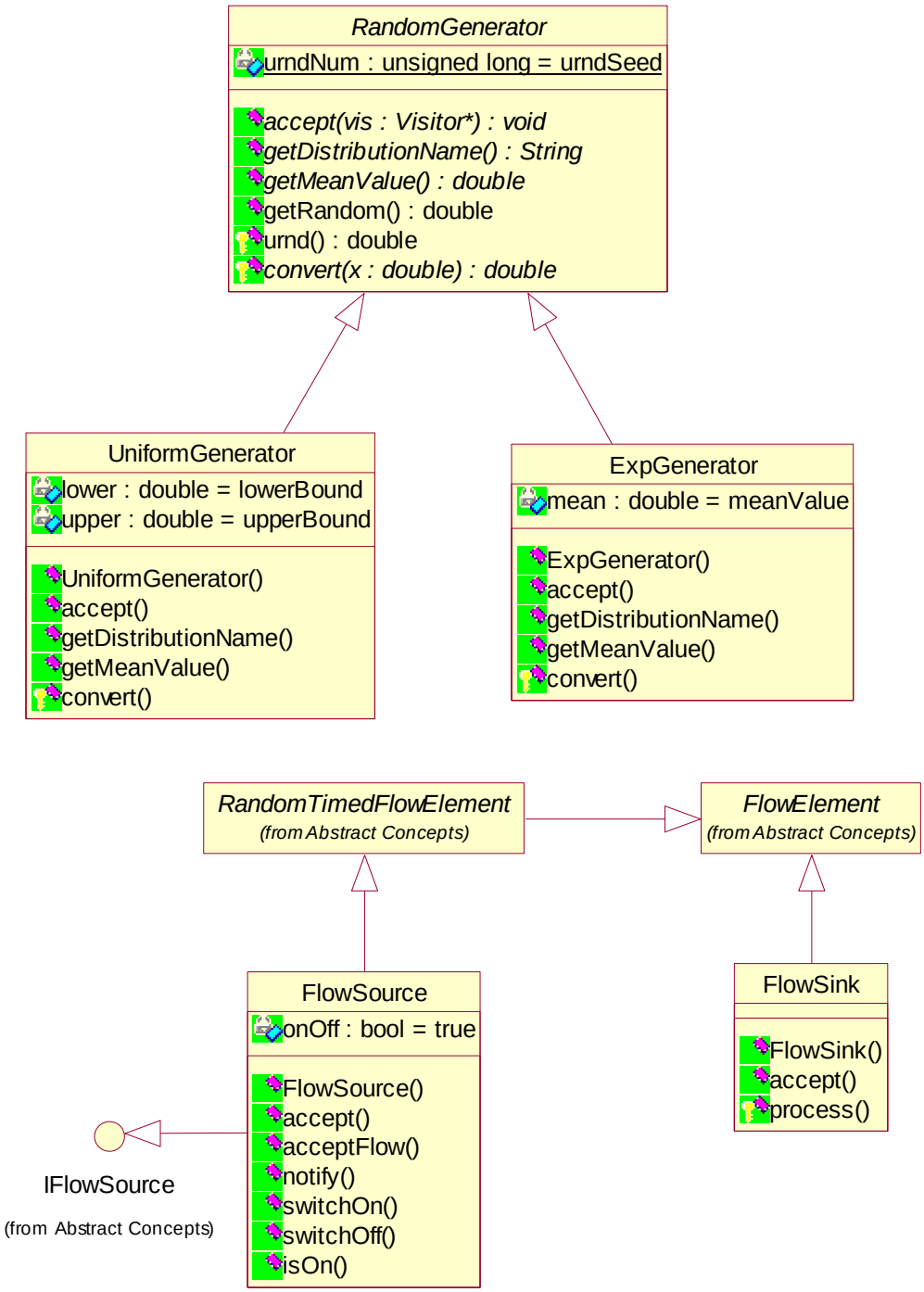
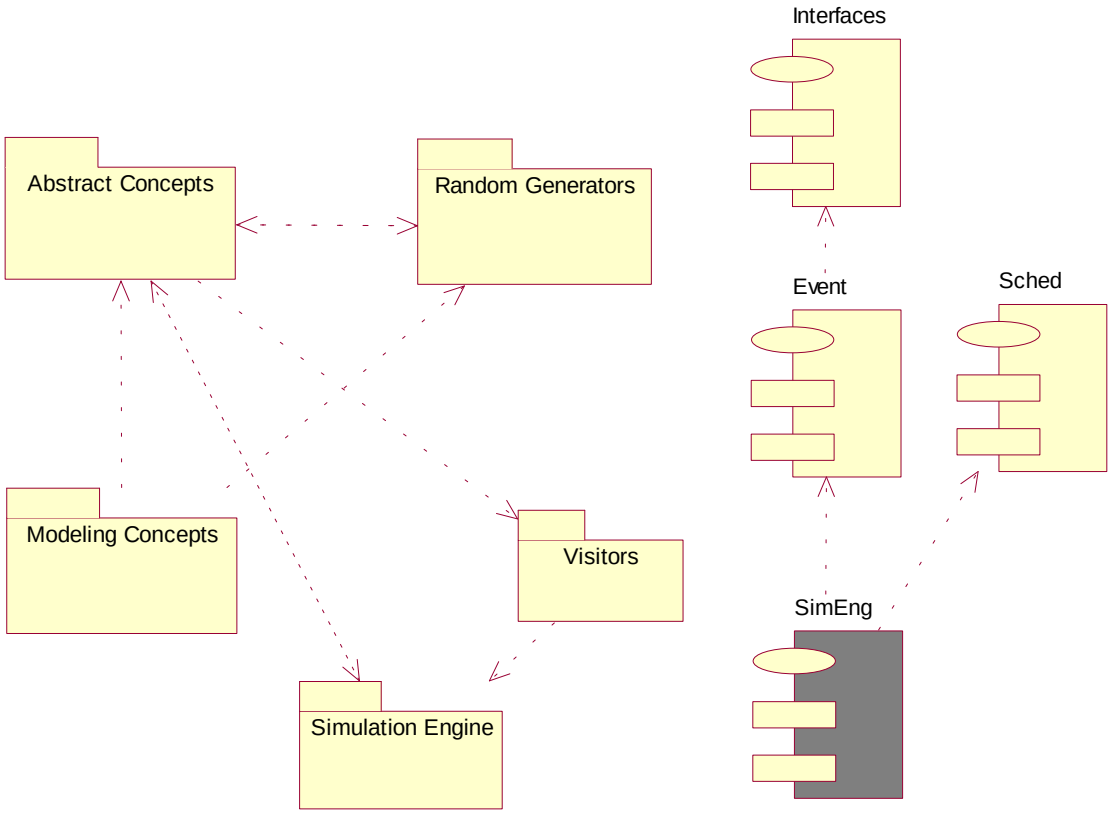
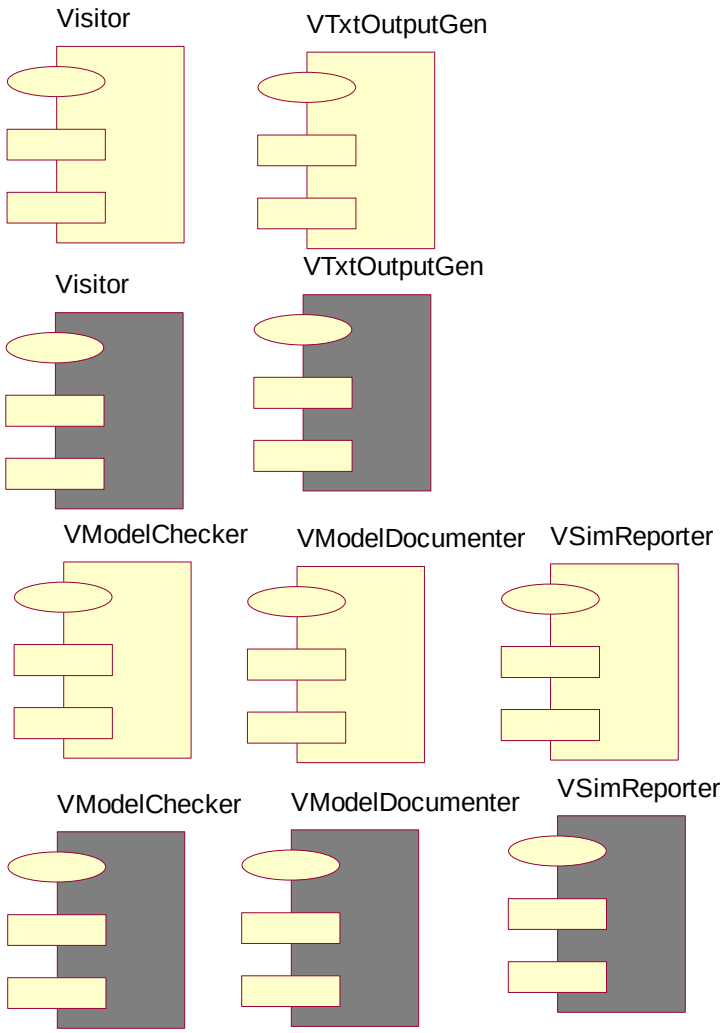
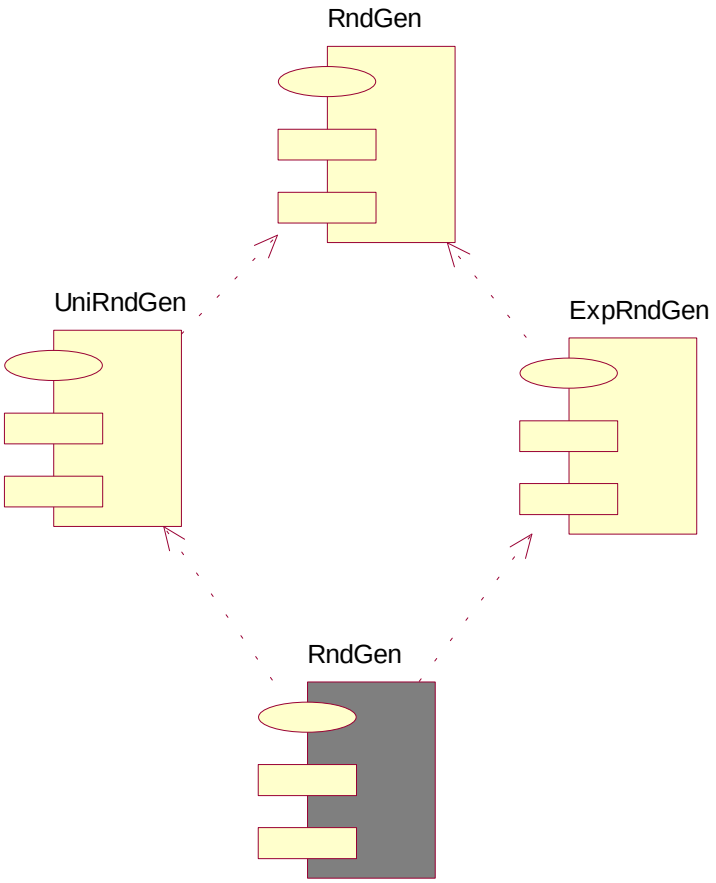

Simulation Engine
Visitors
Concepts
Scheduler
curTime : Time = 0
Instance() : Scheduler*
Scheduler()
put(ev : Event*) : void
getCurTime() : Time
processOneEvent() : bool
processNow() : bool
<<Interface>>
ITimedElement
(from Abstract Concepts)
-target
1
0..1
theScheduler
0..1
-first
Event
n
id : ID = i
time : Time = tm
Event()
create()
getID()
getTarget()
getTime()
setTime()
getNext()
setNext()
-next
0..1
previous
0..1

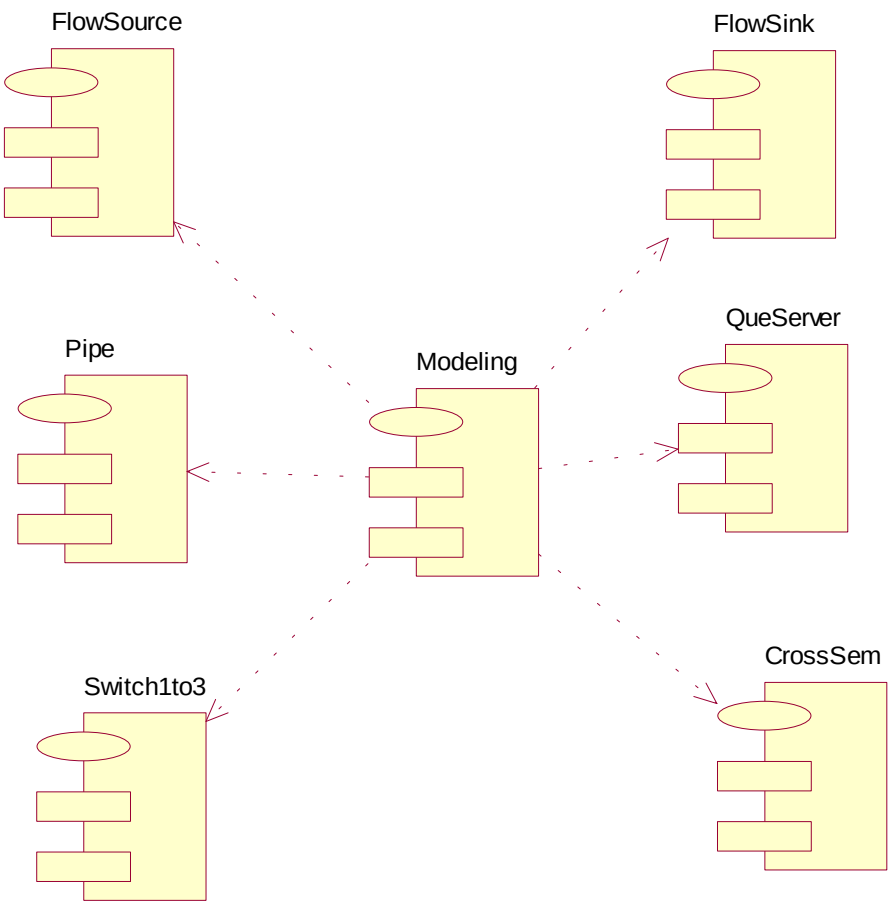

Visitor
visitModel()
visitUniformGenerator()
visitExpGenerator()
visitFlowSource()
visitFlowSink()
visitPipe()
visitQueuedServer()
visitSwitch1to3()
visitCrossSemaphore()
VisTxtOutputGenerator
out : ostream* = outputStream
VisTxtOutputGenerator()
output()
writeNameType()
writeDescrLn()
Abstract Concepts
Random Generators
Modeling Concepts
ModelElement
idCounter : MEID = 0
id : MEID = ++idCounter
name : String
descr : String
ModelElement()
~ModelElement()
accept()
getID()
getName()
setName()
getDescr()
setDescr()
FlowElement
counter : unsigned long = 0
FlowElement()
acceptFlow()
process()
send()
getNumOfOccurrences()
resetCounter()
source
*
0..1
+target
f...
ControlElement
IFlowSource

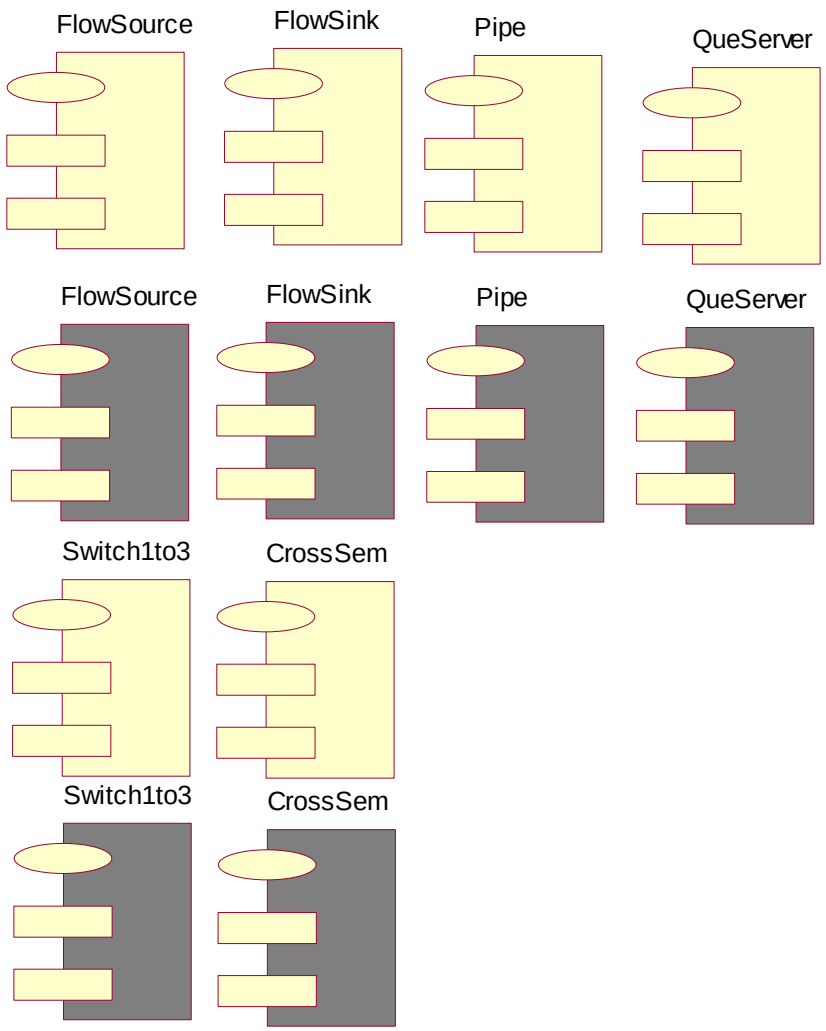

RandomGenerator
urndNum : unsigned long = urndSeed
accept(vis : Visitor*) : void
getDistributionName() : String
getMeanValue() : double
getRandom() : double
urnd() : double
convert(x : double) : double
UniformGenerator
lower : double = lowerBound
upper : double = upperBound
UniformGenerator()
accept()
getDistributionName()
getMeanValue()
convert()
ExpGenerator
mean : double = meanValue
ExpGenerator()
accept()
getDistributionName()
getMeanValue()
convert()
RandomTimedFlowElement
(from Abstract Concepts)
FlowElement
(from Abstract Concepts)
FlowSource
onOff : bool = true
FlowSource()
accept()
acceptFlow()
notify()
switchOn()
switchOff()
isOn()
FlowSink
FlowSink()
accept()
process()
IFlowSource
(from Abstract Concepts)

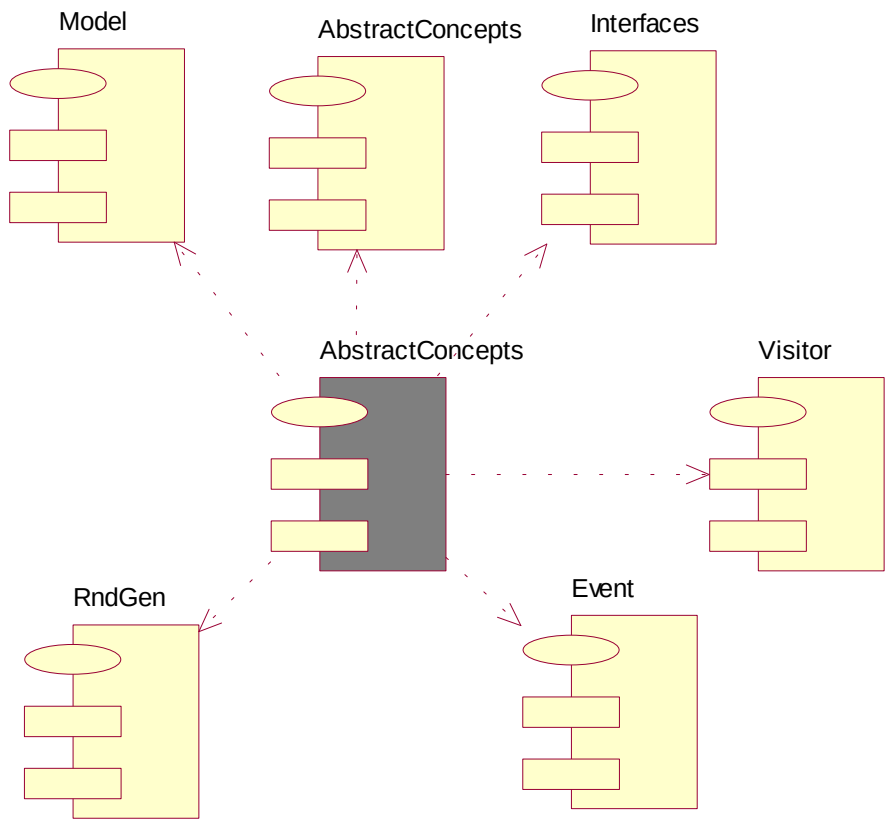

Interfaces
Abstract Concepts
Random Generators
Event
Sched
Modeling Concepts
Visitors
SimEng
Simulation Engine

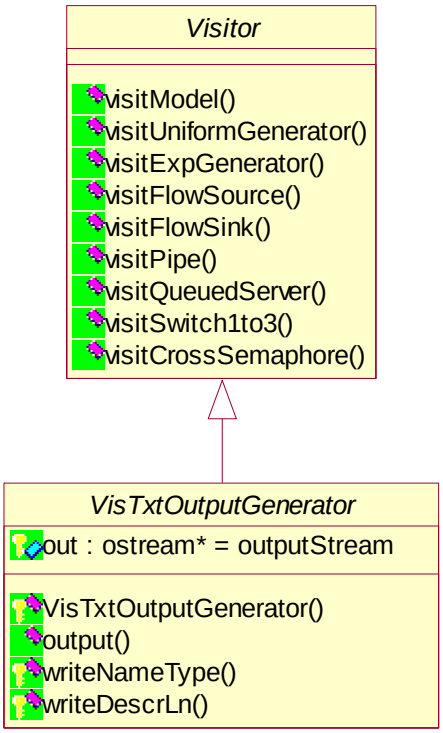

Visitor
VTxtOutputGen
Visitor
VTxtOutputGen
VModelChecker
VModelDocumenter
VSimReporter
VModelChecker
VModelDocumenter
VSimReporter

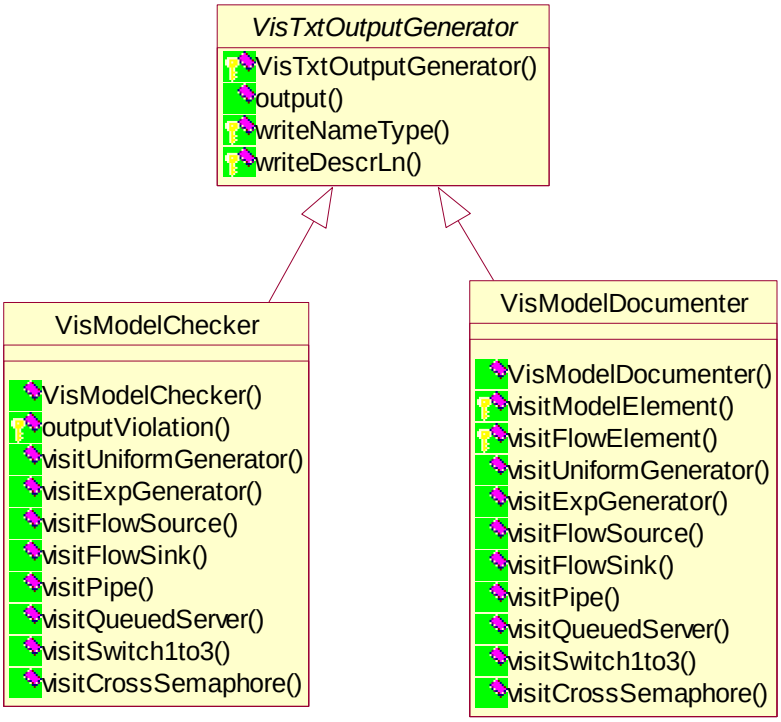

RndGen
UniRndGen
ExpRndGen
RndGen

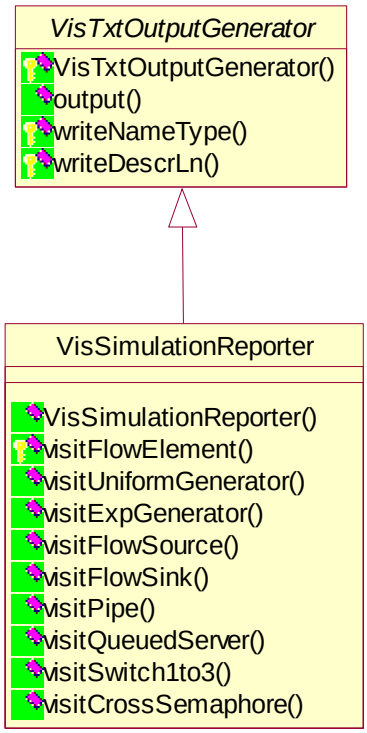

FlowSource
FlowSink
QueServer
Pipe
Modeling
CrossSem
Switch1to3

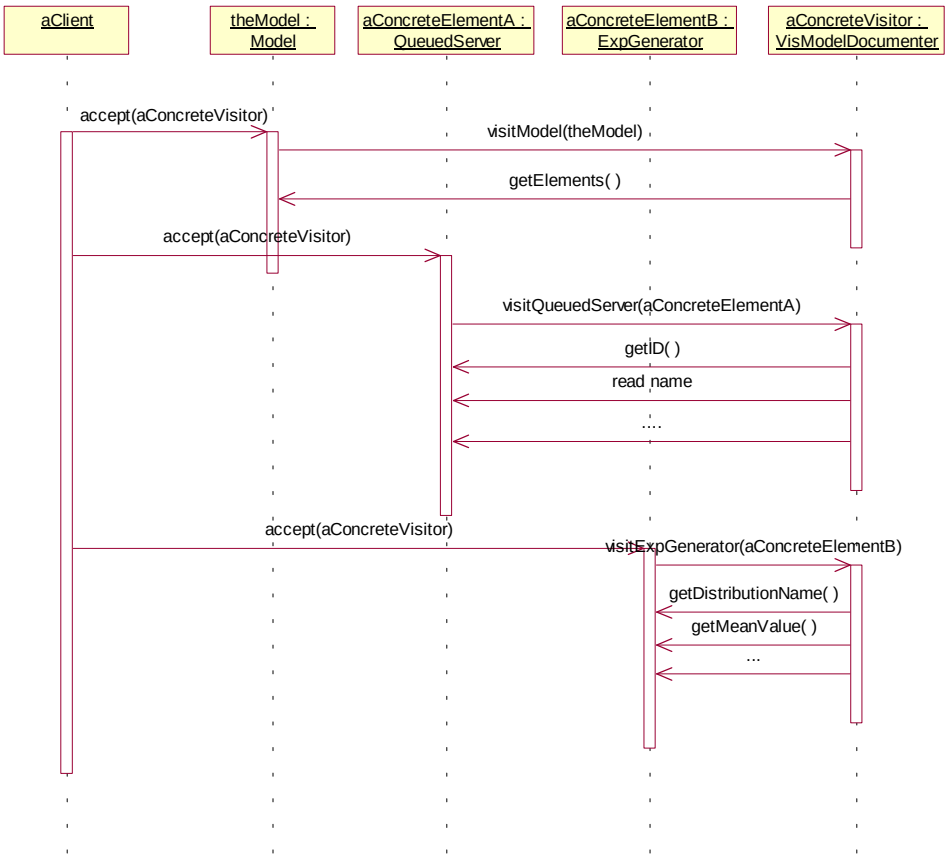

FlowSource
FlowSink
Pipe
QueServer
FlowSource
FlowSink
Pipe
QueServer
Switch1to3
CrossSem
Switch1to3
CrossSem

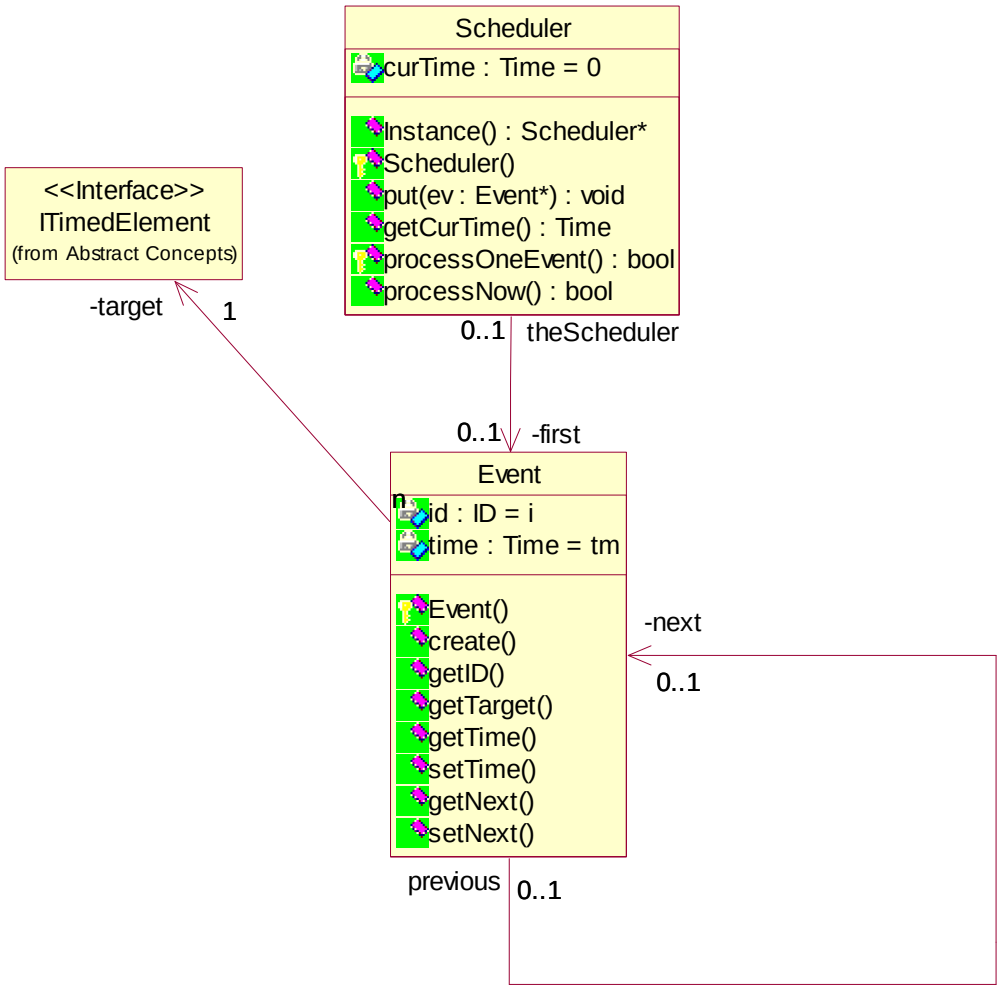

Model
AbstractConcepts
Interfaces
AbstractConcepts
Visitor
RndGen
Event

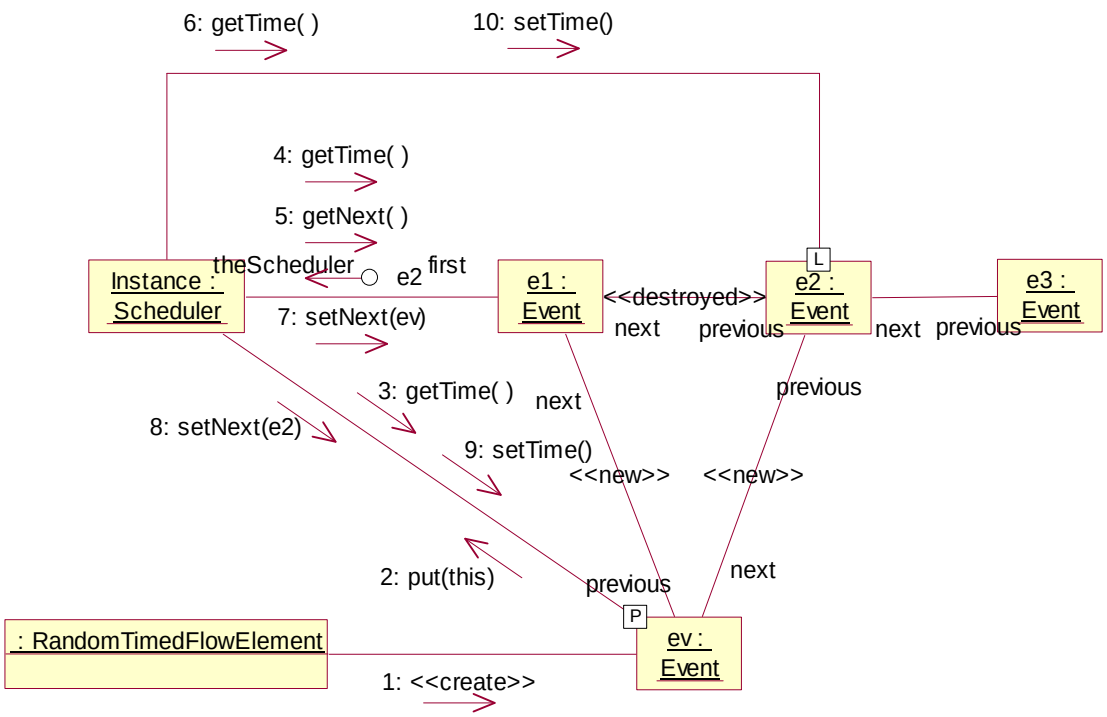

Visitor
visitModel()
visitUniformGenerator()
visitExpGenerator()
visitFlowSource()
visitFlowSink()
visitPipe()
visitQueuedServer()
visitSwitch1to3()
visitCrossSemaphore()
VisTxtOutputGenerator
out : ostream* = outputStream
VisTxtOutputGenerator()
output()
writeNameType()
writeDescrLn()

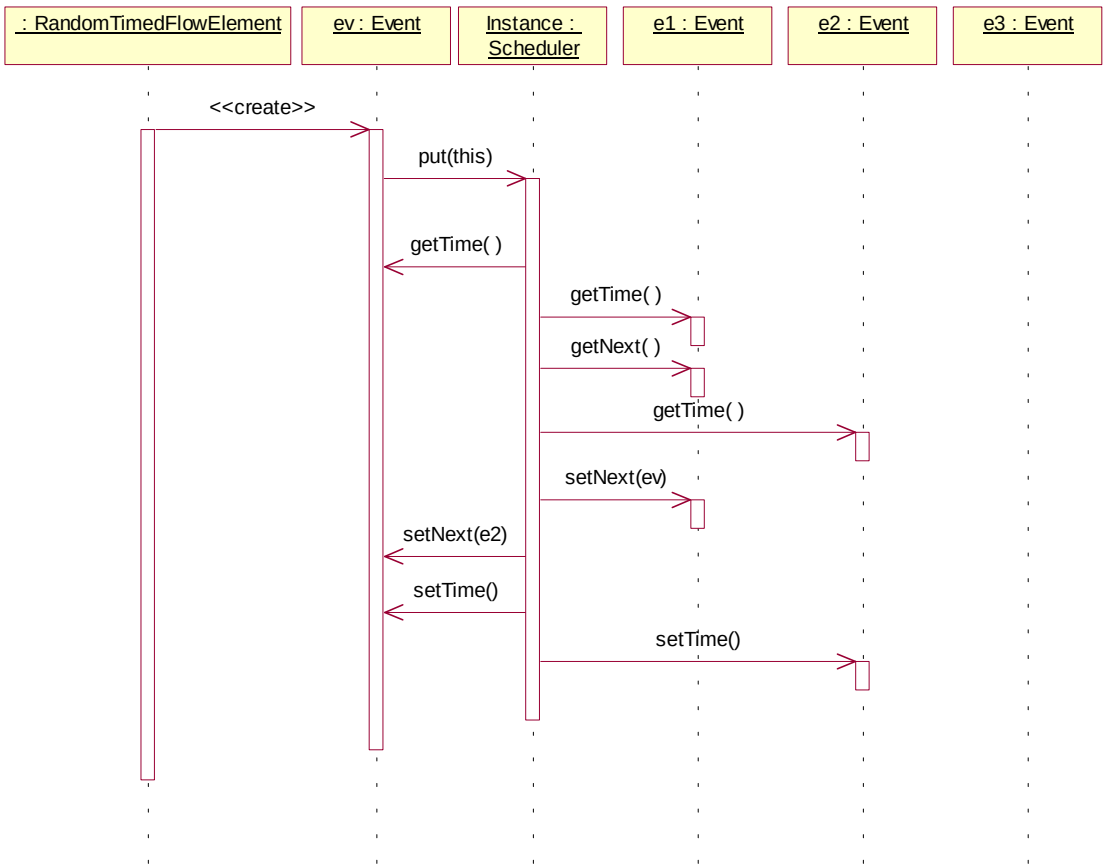

VisTxtOutputGenerator
VisTxtOutputGenerator()
output()
writeNameType()
writeDescrLn()
VisModelChecker
VisModelChecker()
outputViolation()
visitUniformGenerator()
visitExpGenerator()
visitFlowSource()
visitFlowSink()
visitPipe()
visitQueuedServer()
visitSwitch1to3()
visitCrossSemaphore()
VisModelDocumenter
VisModelDocumenter()
visitModelElement()
visitFlowElement()
visitUniformGenerator()
visitExpGenerator()
visitFlowSource()
visitFlowSink()
visitPipe()
visitQueuedServer()
visitSwitch1to3()
visitCrossSemaphore()

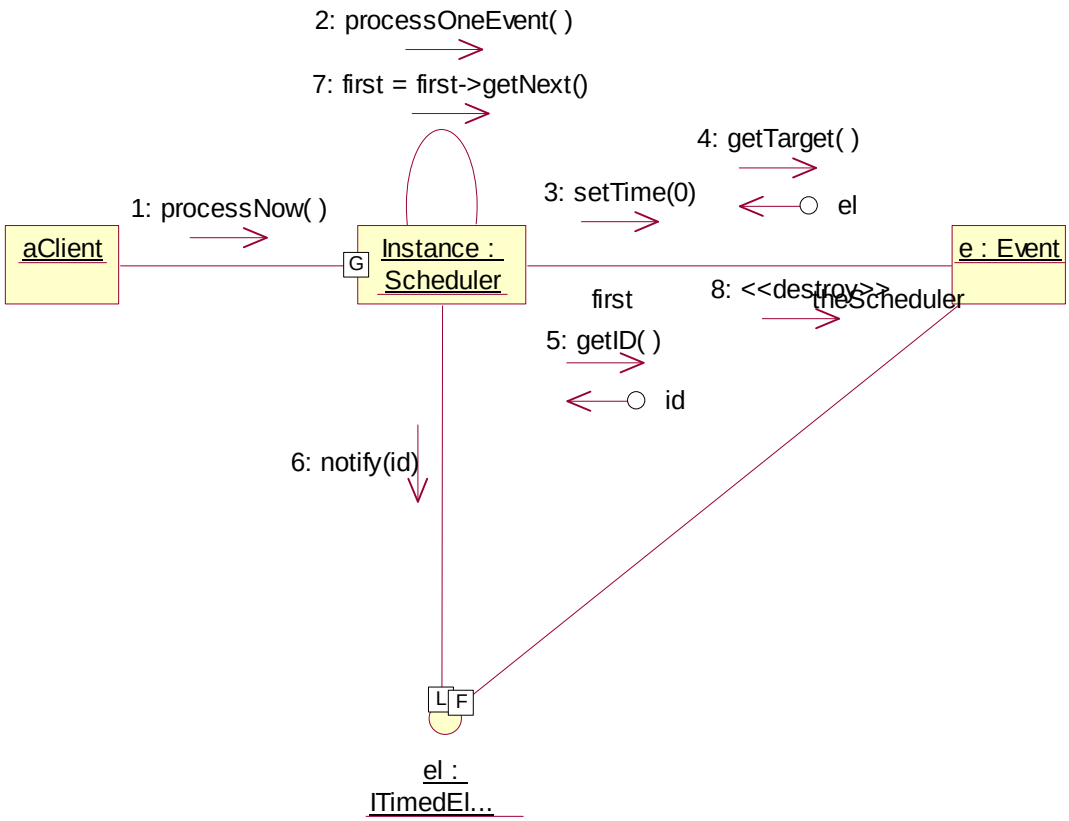

VisTxtOutputGenerator
VisTxtOutputGenerator()
output()
writeNameType()
writeDescrLn()
VisSimulationReporter
VisSimulationReporter()
visitFlowElement()
visitUniformGenerator()
visitExpGenerator()
visitFlowSource()
visitFlowSink()
visitPipe()
visitQueuedServer()
visitSwitch1to3()
visitCrossSemaphore()

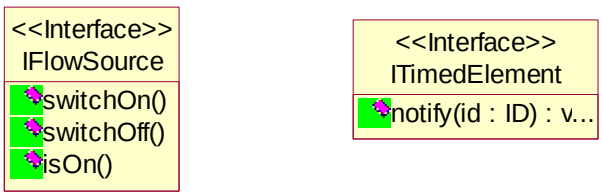

aClient
theModel : Model
aConcreteElementA : QueuedServer
aConcreteElementB : ExpGenerator
aConcreteVisitor : VisModelDocumenter
accept(aConcreteVisitor)
visitModel(theModel)
getElements( )
accept(aConcreteVisitor)
visitQueuedServer(aConcreteElementA)
getID( )
read name
....
accept(aConcreteVisitor)
visitExpGenerator(aConcreteElementB)
getDistributionName( )
getMeanValue( )
...

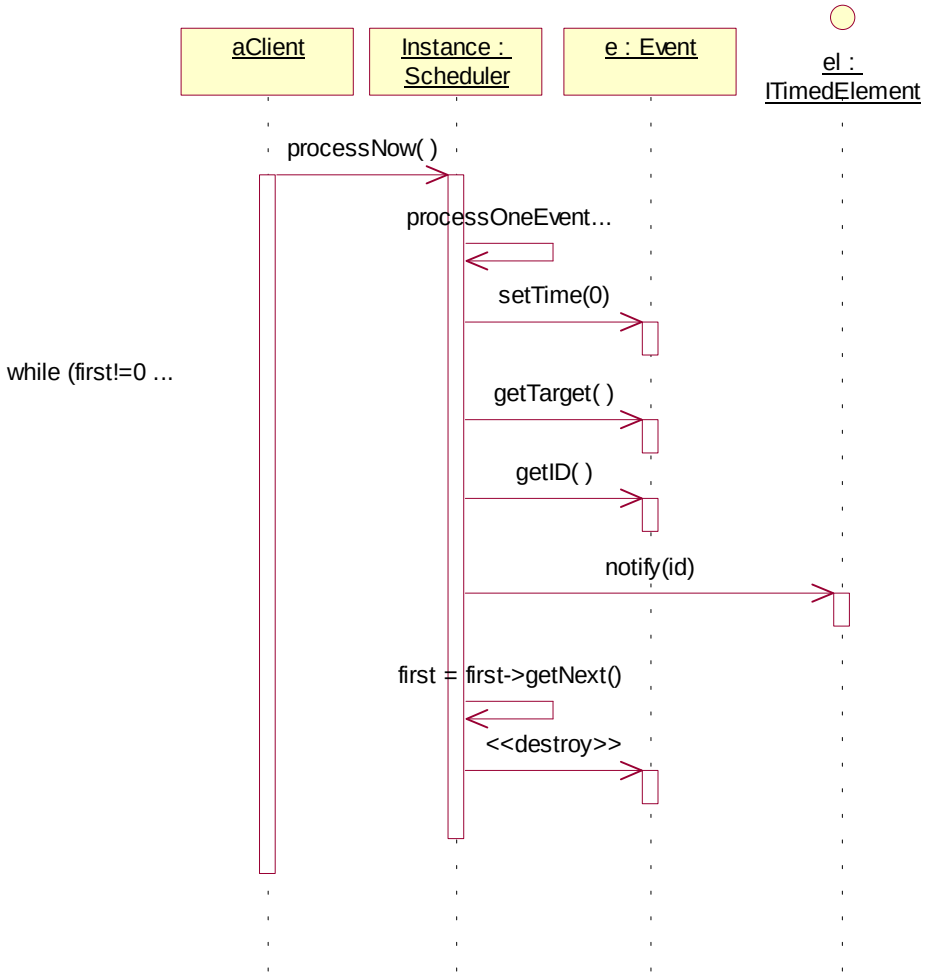

Scheduler
curTime : Time = 0
Instance() : Scheduler*
Scheduler()
put(ev : Event*) : void
getCurTime() : Time
processOneEvent() : bool
processNow() : bool
<<Interface>>
ITimedElement
(from Abstract Concepts)
-target
1
0..1
theScheduler
0..1
-first
Event
n
id : ID = i
time : Time = tm
Event()
create()
getID()
getTarget()
getTime()
setTime()
getNext()
setNext()
-next
0..1
previous
0..1

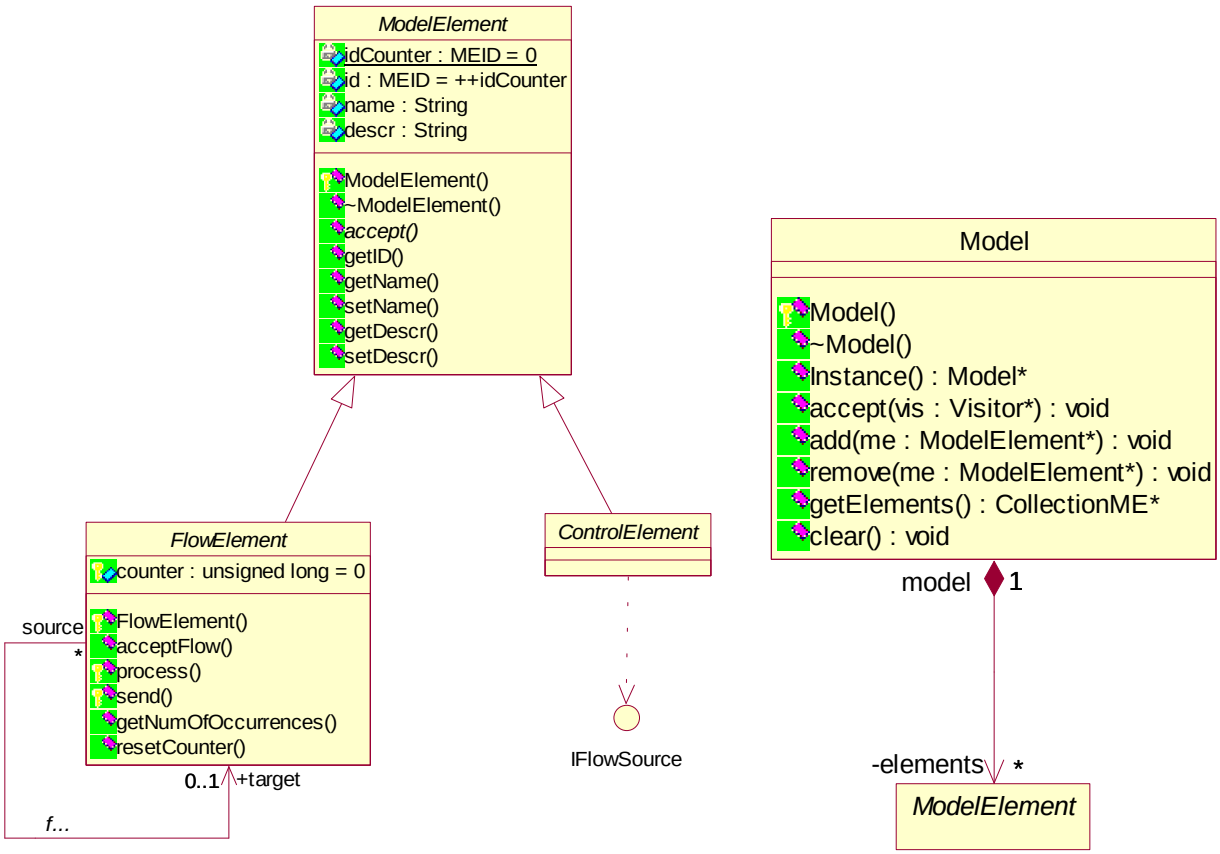

6: getTime( )
10: setTime()
4: getTime( )
5: getNext( )
theScheduler
e2
first
Instance :
Scheduler
e1 :
Event
<<destroyed>>
e2 :
Event
e3 :
Event
L
next
previous
next
previous
7: setNext(ev)
3: getTime( )
next
previous
8: setNext(e2)
9: setTime()
<<new>>
<<new>>
2: put(this)
previous
next
P
: RandomTimedFlowElement
ev :
Event
1: <<create>>

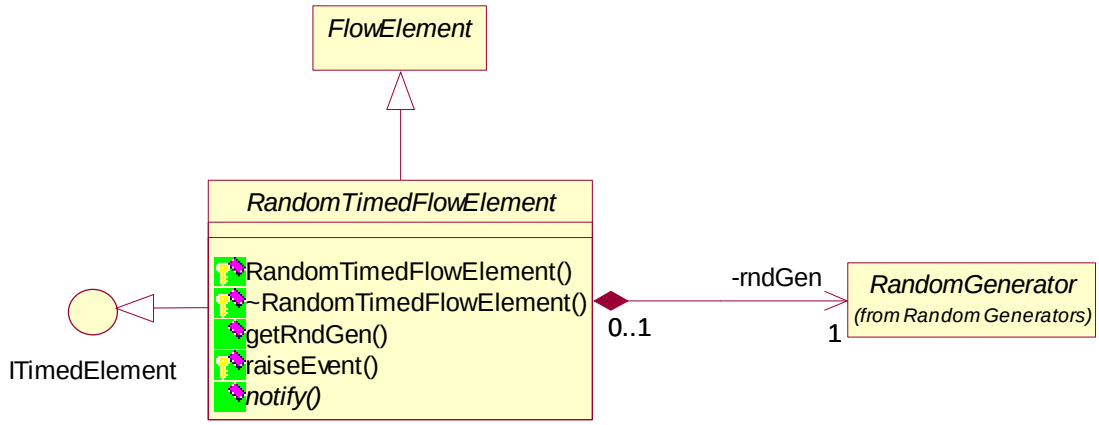

: RandomTimedFlowElement
ev : Event
Instance : Scheduler
e1 : Event
e2 : Event
e3 : Event
<<create>>
put(this)
getTime( )
getTime( )
getNext( )
getTime( )
setNext(ev)
setNext(e2)
setTime()
setTime()

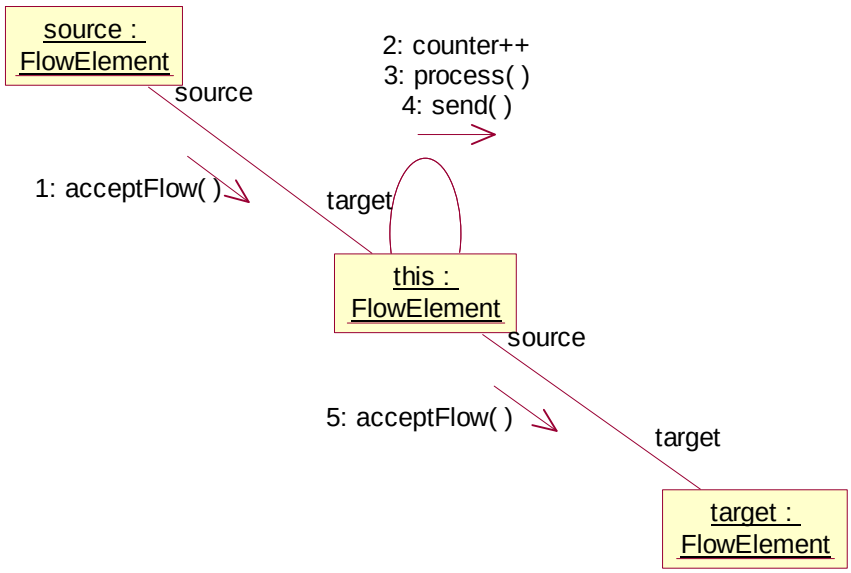

2: processOneEvent( )
7: first = first->getNext()
4: getTarget( )
3: setTime(0)
el
1: processNow( )
aClient
G
Instance : Scheduler
e : Event
first
8: <<destroy>>
theScheduler
5: getID( )
id
6: notify(id)
L
F
el : ITimedEl...

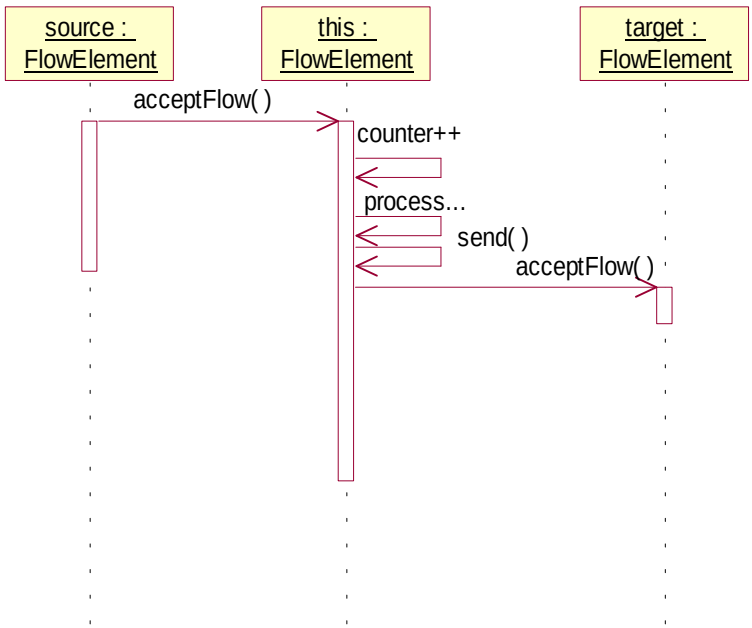

<<Interface>>
IFlowSource
+switchOn()
+switchOff()
+isOn()
<<Interface>>
ITimedElement
+notify(id : ID) : v...

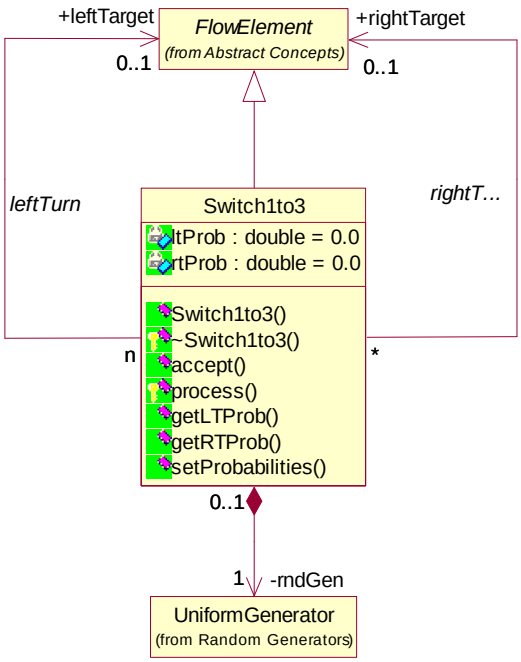

aClient
Instance : Scheduler
e : Event
el : ITimedElement
processNow( )
processOneEvent...
setTime(0)
while (first!=0 ...
getTarget( )
getID( )
notify(id)
first = first->getNext()
<<destroy>>

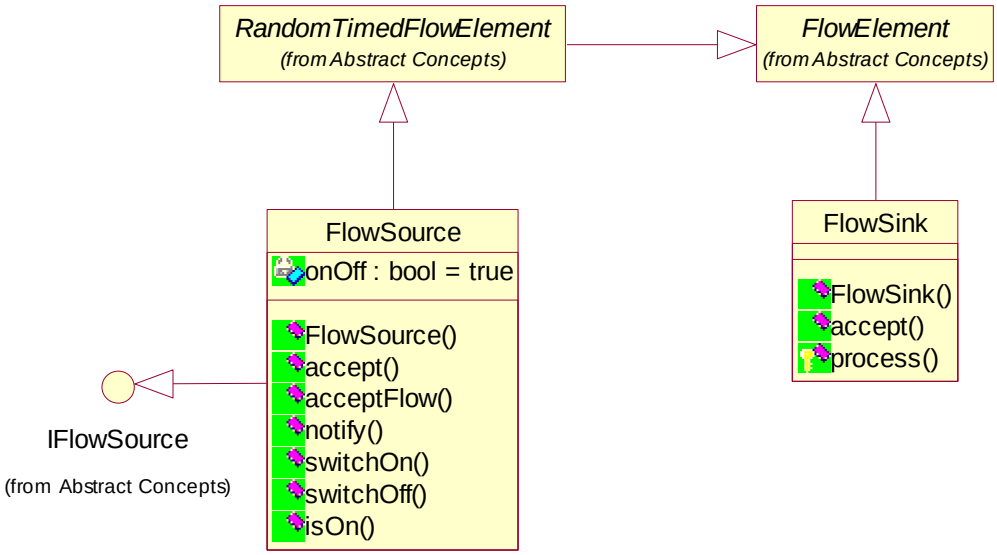

ModelElement
idCounter : MEID = 0
id : MEID = ++idCounter
name : String
descr : String
ModelElement()
~ModelElement()
accept()
getID()
getName()
setName()
getDescr()
setDescr()
Model
Model()
~Model()
Instance() : Model*
accept(vis : Visitor*) : void
add(me : ModelElement*) : void
remove(me : ModelElement*) : void
getElements() : CollectionME*
clear() : void
FlowElement
counter : unsigned long = 0
FlowElement()
acceptFlow()
process()
send()
getNumOfOccurrences()
resetCounter()
source
*
0..1
+target
f...
ControlElement
IFlowSource
model
1
-elements
*
ModelElement

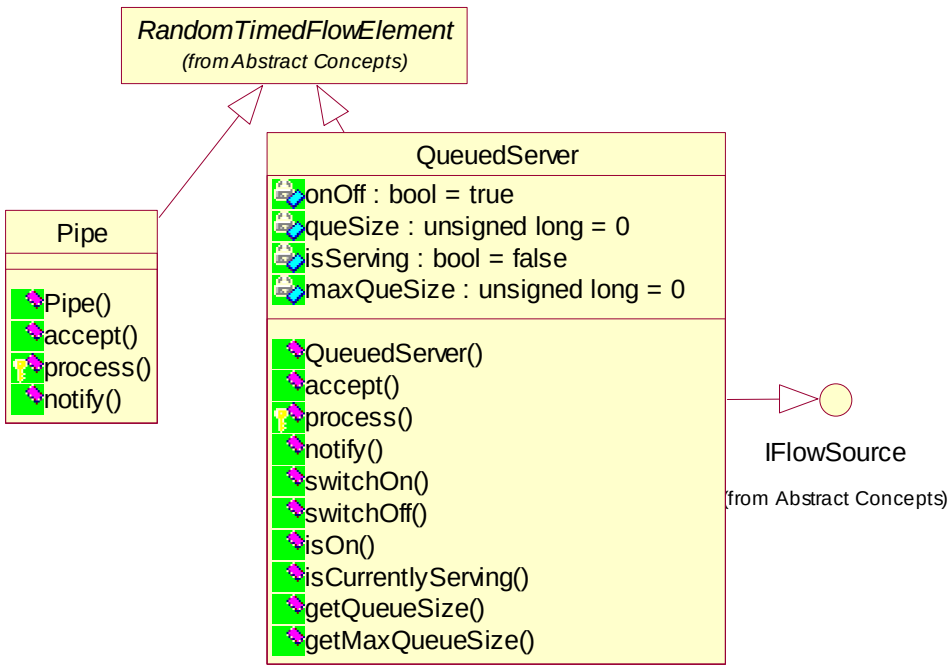

FlowElement
RandomTimedFlowElement
RandomTimedFlowElement()
~RandomTimedFlowElement()
getRndGen()
raiseEvent()
notify()
ITimedElement
-rndGen
0..1
1
RandomGenerator
(from Random Generators)

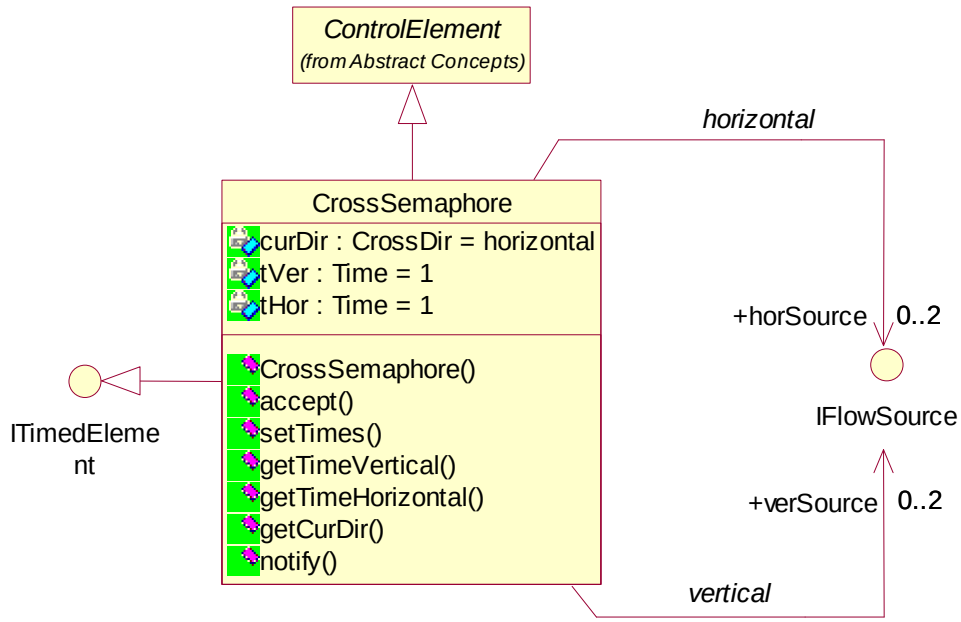

source : FlowElement
source
2: counter++
3: process( )
4: send( )
1: acceptFlow( )
target
this : FlowElement
source
5: acceptFlow( )
target
target : FlowElement


source : FlowElement
this : FlowElement
target : FlowElement
acceptFlow( )
counter++
process...
send( )
acceptFlow( )


+leftTarget
FlowElement
(from Abstract Concepts)
+rightTarget
0..1
0..1
leftTurn
rightT...
Switch1to3
ltProb : double = 0.0
rtProb : double = 0.0
Switch1to3()
~Switch1to3()
accept()
process()
getLTProb()
getRTProb()
setProbabilities()
n
*
0..1
1
-rndGen
UniformGenerator
(from Random Generators)


RandomTimedFlowElement
(from Abstract Concepts)
FlowElement
(from Abstract Concepts)
FlowSource
onOff : bool = true
FlowSource()
accept()
acceptFlow()
notify()
switchOn()
switchOff()
isOn()
FlowSink
FlowSink()
accept()
process()
IFlowSource
(from Abstract Concepts)


RandomTimedFlowElement
(from Abstract Concepts)
Pipe
Pipe()
accept()
process()
notify()
QueuedServer
onOff : bool = true
queSize : unsigned long = 0
isServing : bool = false
maxQueSize : unsigned long = 0
QueuedServer()
accept()
process()
notify()
switchOn()
switchOff()
isOn()
isCurrentlyServing()
getQueueSize()
getMaxQueueSize()
IFlowSource
(from Abstract Concepts)


ControlElement
(from Abstract Concepts)
horizontal
CrossSemaphore
curDir : CrossDir = horizontal
tVer : Time = 1
tHor : Time = 1
CrossSemaphore()
accept()
setTimes()
getTimeVertical()
getTimeHorizontal()
getCurDir()
notify()
ITimedEleme
nt
+horSource
0..2
IFlowSource
+verSource
0..2
vertical