Subjective ME

Consultation for Subject-Orientated Process Modeling and Management

Process Report for

2024-02-16-Recursive Execution Model for PASS - with injections

Prepared for

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Project Structure:

The model consists of one base page and 6 extending layers. Each of the layers defines its own SID. The layers will be presented one by one, in hierarchical order.

Hierarchical layer tree:

---------- **SID 1**

|--------- **SID Guards 1**

|--------- **SID Guards Injection Handling**

|--------- **SID Guards Timer and Ad Hoc**

|--------- **SID Guards User Cancel**

|--------- **Executability Macro**

|--------- **SID Guards 2**

SID 1

Subject Interaction Diagram:

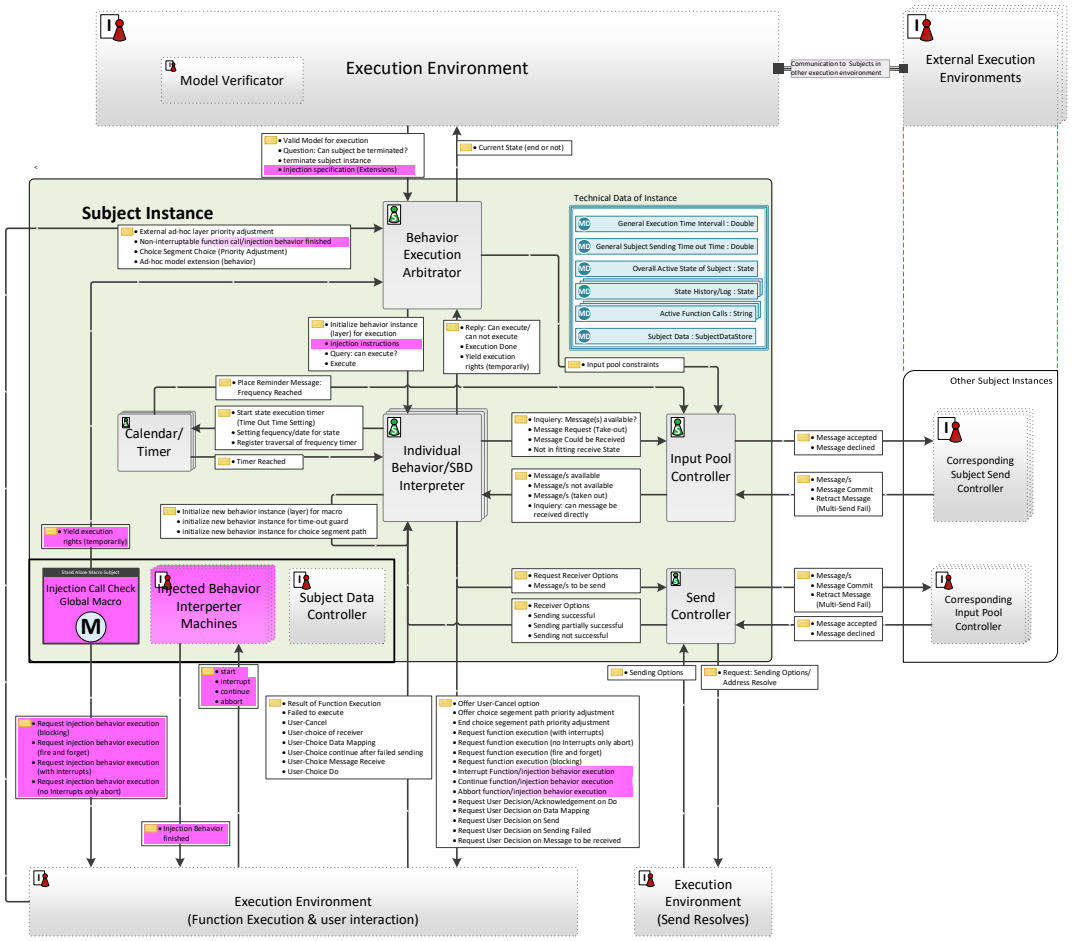

Figure 1: Subject-Oriented Referential Process Model of Report for Process: 2024-02-16-Recursive Execution Model for PASS - with injections

Subject Short Description

The areas of activity described in the model represent the principal aspects necessary for the holistic execution of strategic product planning.

There are 15 subjects **being part of SID 1:**

Individual Behavior/SBD Interpreter

Execution Environment

External Execution Environments

Model Verificator

Behavior Execution Arbitrator

Calendar/Timer

Input Pool Controller

Corresponding Subject Send Controller

Send Controller

Corresponding Input Pool Controller

Execution Environment (Function Execution & user interaction)

Execution Environment (Send Resolves)

Subject Data Controller

Comment: Handels Data of Subject as defined in interpereted model as well as the technical data of this subject instance

Injected Behavior Interperter Machines

Comment: mainly function call injection

Injection Call Check Global Macro

Messages

Depending on the organization size and chosen level of formalism, the possible forms of messages are broad. They may be elaborated formal reports spanning many pages of written text, conveyed or stored in an organization's internal information management systems. Equally possible is a scenario where the same information, if at all, is formulated and conveyed purely informal on a personal level in form of verbal instructions and decisions or in meetings.

There are 84 messages **being sent in SID 1:**

Request injection behavior execution (blocking) (MessageSpecification_1459)

Comment: blocking functions calls lock the whole execution engine until call has been resolved and returned (very powerfull)

start (SID_1_MessageSpecification_1471)

interrupt (MessageSpecification_1473)

Valid Model for execution (MessageSpecification_908)

Question: Can subject be terminated? (MessageSpecification_904)

Current State (end or not) (MessageSpecification_910)

Reply: Can execute/can not execute (MessageSpecification_931)

Execution Done (MessageSpecification_940)

Yield execution rights (temporarily) (MessageSpecification_944)

Initialize behavior instance (layer) for execution (MessageSpecification_934)

Query: can execute? (MessageSpecification_936)

Execute (MessageSpecification_938)

Input pool constraints (MessageSpecification_952)

External ad-hoc layer priority adjustment (MessageSpecification_960)

Non-interruptable function call/injection behavior finished (MessageSpecification_906)

Start state execution timer (Time Out Time Setting) (MessageSpecification_993)

Setting fequency/date for state (MessageSpecification_991)

Register traversal of frequency timer (MessageSpecification_995)

Timer Reached (MessageSpecification_997)

Place Reminder Message: Frequency Reached (MessageSpecification_1005)

Inquiery: Message(s) available? (MessageSpecification_1021)

Message Request (Take-out) (MessageSpecification_1019)

Message Could be Received (MessageSpecification_1025)

Not in fitting receive State (MessageSpecification_1023)

Message/s available (MessageSpecification_1031)

Message/s not available (MessageSpecification_1027)

Message/s (taken out) (MessageSpecification_1029)

Inquiery: can message be received directly (MessageSpecification_1033)

Message/s (MessageSpecification_1047)

Message Commit (MessageSpecification_1051)

Retract Message (Multi-Send Fail) (MessageSpecification_1049)

Message accepted (MessageSpecification_1053)

Message declined (MessageSpecification_1055)

Request Receiver Options (MessageSpecification_1079)

Comment: This message may require multiple information. Regarding wether previous contact has been made, what the current context is etc.

Message/s to be send (MessageSpecification_1077)

Receiver Options (MessageSpecification_1087)

Sending successful (MessageSpecification_1081)

Sending partially successful (MessageSpecification_1083)

Sending not successful (MessageSpecification_1085)

Message/s (MessageSpecification_1102)

Message Commit (MessageSpecification_1104)

Retract Message (Multi-Send Fail) (MessageSpecification_1106)

Message accepted (MessageSpecification_1108)

Message declined (MessageSpecification_1110)

Initialize new behavior instance (layer) for macro (MessageSpecification_1179)

Comment: including origin state information

initialize new behavior instance for time-out guard (MessageSpecification_1181)

initialize new behavior instance for choice segment path (MessageSpecification_1183)

Result of Function Execution (MessageSpecification_1197)

Failed to execute (MessageSpecification_1199)

User-Cancel (MessageSpecification_1201)

User-choice of receiver (MessageSpecification_1203)

User-Choice Data Mapping (MessageSpecification_1205)

Comment: Choice of the user which data to put into a message to be sent or data from a received message to be stored

User-Choice continue after failed sending (MessageSpecification_1207)

User-Choice Message Receive (MessageSpecification_1209)

User-Choice Do (MessageSpecification_1211)

Offer User-Cancel option (MessageSpecification_1221)

Offer choice segement path priority adjustment (MessageSpecification_1239)

Comment: this is the trigger that should give some user interface to adjust the priority. the answer is send to the arbitrator

End choice segement path priority adjustment (MessageSpecification_1241)

Comment: remember that these can be nested (mutliple choice segments active at the same time) so it should always match the creating message

Request function execution (with interrupts) (MessageSpecification_1213)

Comment: Each time the behavior is iterrupted due to guards (normal or even due to time slice mode time restrictions) the function call is also stopped, either to be resumed later or to be aborted if the state is left)

Request function execution (no Interrupts only abort) (MessageSpecification_1223)

Comment: the function call is not interrupted even if the behavior of the calling state is. But if the calling state is left due to guards or similar the function execution is aborted)

Request function execution (fire and forget) (MessageSpecification_1235)

Comment: Fire and forget function calls are not cared for by the engine after initializing

Request function execution (blocking) (MessageSpecification_1237)

Comment: blocking functions calls lock the whole execution engine until call has been resolved and returned (very powerfull)

Interrupt Function/injection behavior execution (MessageSpecification_1215)

Continue function/injection behavior execution (MessageSpecification_1217)

Abbort function/injection behavior execution (MessageSpecification_1219)

Request User Decision/Acknowledgement on Do (MessageSpecification_1233)

Request User Decision on Data Mapping (MessageSpecification_1227)

Comment: Different for send and receive

Request User Decision on Send (MessageSpecification_1225)

Request User Decision on Sending Failed (MessageSpecification_1229)

Request User Decision on Message to be received (MessageSpecification_1231)

terminate subject instance (MessageSpecification_902)

Request: Sending Options/Address Resolve (MessageSpecification_1265)

Comment: it may be the case that the subject instance to be send to is not known or not even existing yet. Even more so if it is an instance existing within a spearated execution envoironment. In that case the resolve of the address or even external request need to be undertaken by the envoironment

Sending Options (MessageSpecification_1269)

Comment: Possible subjects and/or possible subject carriers ? Possible other execution environments

Choice Segment Choice (Priority Adjustment) (MessageSpecification_962)

Comment: by default this should only occure for choice segement path behaviors and the calling layers.

Ad-hoc model extension (behavior) (MessageSpecification_1280)

injection specification (Extensions) (MessageSpecification_1376)

injection instructions (MessageSpecification_1379)

Request injection behavior execution (with interrupts) (MessageSpecification_1451)

Comment: Each time the behavior is iterrupted due to guards (normal or even due to time slice mode time restrictions) the function call is also stopped, either to be resumed later or to be aborted if the state is left)

Request injection behavior execution (no Interrupts only abort) (MessageSpecification_1453)

Comment: the function call is not interrupted even if the behavior of the calling state is. But if the calling state is left due to guards or similar the function execution is aborted)

Request injection behavior execution (fire and forget) (MessageSpecification_1455)

Comment: Fire and forget function calls are not cared for by the engine after initializing

Injection Behavior finished (SID_1_MessageSpecification_1466)

continue (MessageSpecification_1521)

abbort (MessageSpecification_1523)

Yield execution rights (temporarily) (MessageSpecification_1627)

Subjects and Their Internal Behavior

In this section, each subject from the subject interaction diagram is individually presented.

Individual Behavior/SBD Interpreter in SID 1

Figure 2: **Individual Behavior/SBD Interpreter**

Extends relation:

This subject takes part in hierarchical subject extension tree (it is extended by another subject).

In the following tree, the current subject is marked with a star (*):

---------- Individual Behavior/SBD Interpreter <-- (*)

|--------- Guard Interpreter: Direct Excutability

|--------- Guard Injections Handling

|--------- Guard Timer Transition Handling

|--------- Guard Interpreter: User Cancel

|--------- Macro Check Executability

|--------- Guard Interpreter: Arbitrator interatction

Subject behavior:

This subject is connected with a Subject Behavior Diagram. The SBD is displayed on a following page.

Functions States:

Determine how to handle Receiver Options

Comment: Could be done automatically if only one target exists, but if not, user input might be necessary

prepare message (map data)

determine message(s) to be considered

Comment: when multiple transitions are outgoing of the state, this may depend on the given priorities on the outgoing receive transitions of the send state currently executed. Equally also an external choice by the user/or engine can be made. Also acknowledgement of the user may be necessary even if only one possibility exists

Check for macro call

Check for Outgoing Reminder Transitions (first visit only)

Comment: Basically only receive state should have reminder transitions. A frequency based reminder transition in a do state is basically a repeating time-out and should be handled as such in the previous state.

Check for external function calls

Comment: an external function call is the instruction for the execution envoironment to start or call some kind of execution that is not part of the PASS model description but outside of the jurisdiction of the runtime envoironment (e.g. the call to a web-service)

Choose outgoing Edge according to results/conditions

Comment: Check for the exit conditions of all outgoing states. If the behvaior has regain controlled at least one should be fullfilled. The result might depend on the return values of an prior function call, macro call, a current set data value in a subjects-data-storag. The simplest version is that the call has been finished (done). If there are multiple outgoing transitions with fullfilled exit condition than an outside decission is necessary which in turn might simply be a user input or the evaltuion of the priority number of the outgoing transitions.

Check for User Cancels

Comment: user cancels can be a special function with receive states and send states. Do-States also are allowed to have them but for them they function very similar to standard do transition

Log State history and change overall active state

Comment: by default, this should be a completely new state, except if this is a "sub-state" in a Macro, Guard (with return to origin), or the end state of a choice-segement path behavior. In those cases, the current sub-state needs to be changed if the next state is in that behavior itself. End states of choice segment path behaviors do not matter they simply end and stay while their sibling behaviors might be still active

Update Behavior's own last-known state

Comment: this might be different from the previous state, because there are "return to origin references" and complex state constructs

Determine Target State of chosen or executed transition.

Comment: usually the target of the chosen transition. But if the target is a "return to origin" state this is a little bit mor complicated. A macro behavior or any behavior with a "return to origin" target simply goes back to the less complex state.

Check for timer/time-out transitions

Comment: Also reminder (timer) transitions in do states should be considered repeating reminders. A guard that is only for a single state

Create/update and set complex state

Comment: So the official state of the subject is to be in "this" state for the macro calling behavior but also in the start state of the macro behavior that has a higher priority.

type of state?

Create/Update and set nested state

Comment: The official state of the subject is to be in "this" choic semgent in calling behavior but also in the virtual start state of each of the choice segment paths. The structure of this nested state in this case is kind of tree-structure.

analyze current state

Comment: possibly with a small delay in the beginning to make sure that the arbitrator has set in

change current subject state to guard receive

Comment: complex state. needs to be done since when a guard is triggered the official state has not changed up until now

Choose outgoing Edge according to results/conditions

Comment: This should only be executed when returning and the executabilitie is given. potentially a wait period is necessary until the guard is triggerd

(possibly) process returning information

execute data mapping (if applicable)

Determin how to continue

Determin how to continue

prepare data mapping (if applicable)

Injection Point (BEFORE DATA BINDING)

Injection Point (AFTER MACRO)

Injection Point (BEFORE MACRO/AFTER FUNCTION)

Injection Point (BEFORE STATE)

Comment: May contain various injected behaviors, priority needs to be established, default is first injected highes priority.

Injection Point (AFTER STATE)

Injection Point (BEFORE DATA MAPPING)

Injection Point (BEFORE DATA MAPPING)

Injection Point (BEFORE FUNCTION)

Injection Point (BEFORE DATA BINDING)

Receiving States:

Wait for reply

receive receiver options

Receive receiver instructions

Receive mapping instructions

receive message

Receive receive instructions

Receive mapping instructions

Receive Instructions

Receive User Decision/Acknoledgement

Await possible response or finished message

Comment: not all funciton call might return a value, but in that case the execution envoironment is to send at least some kind of response (default or that the call was at least initialized)

Receive User Decision/Acknoledgement

Await Instantiation

Sending States:

Send Messages

Request receiver options

request user choice/external decission

request user choice/external decission

request message(s) from inbox

request user choice/external decission

request user choice/external decission

Initialize Reminder

yield execution rights for macro behavior

Comment: upon reavaluation the macro behavior should be in an executable state

Request User Decision on Sending Failed

Create Interrupt Behavior for Timer

Set timer

Comment: Note for mutliple time-out transition take the shortest (beware of time vs. business days)

offer user cancel choice

Request User Decision/Acknoledgement

Update Reminder/Calender

Load and initialize Macro behavior

Comment: The macro behavior needs a priority lower than the calling behavior to not disturb guard behaviors of the calling layer.

request external function execution

Comment: There can be various modes for how a function call is happening. Cross check the options

request external function execution

Comment: There can be various modes for how a function call is happening. Cross check the options

request external function execution

Comment: There can be various modes for how a function call is happening. Cross check the options

yield execution rights for choice segement behavior

Comment: initially the mandatory choice segement path behaviors should have a higher priority than this calling behavior. Yielding control and should lead to a situation where the first all choice segement paths behaviors are executed. When this behavior regains control all mandatory conditions should have been met and only choice of the outgoing transition is left that behaves exactly as a do state.

create a choice segement path behaviors

Comment: An individual behavior is created for each choice segement path adding a virtual start and end Do-State to each (necessary to monitor the "mandatory to start" and "mandatory to end" conditions). choice segement path behaviors (CSPB) are grouped always together, but their priority values can change (set from outside be the user). Next to setting the priority order within the CSPB-group as soon as all mandatory to...conditions are fullfilled the user has the option to set the priority of the group below the priority of the calling behvior in order to advance it. Default priority of the CSPB group is simply from "left to right" or rather from the first mentioned to the last.

End Choice segement behaviors priority adjustment

Comment: when execution is resumed here all condition should have met

Offer user choice segment priority adjustment for paths

Cancel any still running function execution

Comment: not if this is the "sub-state" and the function is executed in a higher state in that hierarchie. But this has to be done especially if this is a guard behavior that changes the overall state

report state finished

Request User Decision/Acknoledgement

Set freqency/reminder Timers

request external function execution

Outgoing messages:

"Reply: Can execute/can not execute" To **Behavior Execution Arbitrator**

"Execution Done" To **Behavior Execution Arbitrator**

"Yield execution rights (temporarily)" To **Behavior Execution Arbitrator**

"Start state execution timer (Time Out Time Setting)" To **Calendar/Timer**

"Setting fequency/date for state" To **Calendar/Timer**

"Register traversal of frequency timer" To **Calendar/Timer**

"Inquiery: Message(s) available?" To **Input Pool Controller**

"Message Request (Take-out)" To **Input Pool Controller**

"Message Could be Received" To **Input Pool Controller**

"Not in fitting receive State" To **Input Pool Controller**

"Request Receiver Options" To **Send Controller**

"Message/s to be send" To **Send Controller**

"Initialize new behavior instance (layer) for macro" To **Individual Behavior/SBD Interpreter**

"initialize new behavior instance for time-out guard" To **Individual Behavior/SBD Interpreter**

"initialize new behavior instance for choice segment path" To **Individual Behavior/SBD Interpreter**

"Offer User-Cancel option" To **Execution Environment (Function Execution & user interaction)**

"Offer choice segement path priority adjustment" To **Execution Environment (Function Execution & user interaction)**

"End choice segement path priority adjustment" To **Execution Environment (Function Execution & user interaction)**

"Request function execution (with interrupts)" To **Execution Environment (Function Execution & user interaction)**

"Request function execution (no Interrupts only abort)" To **Execution Environment (Function Execution & user interaction)**

"Request function execution (fire and forget)" To **Execution Environment (Function Execution & user interaction)**

"Request function execution (blocking)" To **Execution Environment (Function Execution & user interaction)**

"Interrupt Function/injection behavior execution" To **Execution Environment (Function Execution & user interaction)**

"Continue function/injection behavior execution" To **Execution Environment (Function Execution & user interaction)**

"Abbort function/injection behavior execution" To **Execution Environment (Function Execution & user interaction)**

"Request User Decision/Acknowledgement on Do" To Execution Environment (Function Execution & user interaction)

"Request User Decision on Data Mapping" To Execution Environment (Function Execution & user interaction)

"Request User Decision on Send" To Execution Environment (Function Execution & user interaction)

"Request User Decision on Sending Failed" To Execution Environment (Function Execution & user interaction)

"Request User Decision on Message to be received" To Execution Environment (Function Execution & user interaction)

Receiving messages:

"Initialize behavior instance (layer) for execution" From **Behavior Execution Arbitrator**

"Query: can execute?" From **Behavior Execution Arbitrator**

"Execute" From **Behavior Execution Arbitrator**

"Timer Reached" From **Calendar/Timer**

"Message/s available" From **Input Pool Controller**

"Message/s not available" From **Input Pool Controller**

"Message/s (taken out)" From **Input Pool Controller**

"Inquiery: can message be received directly" From **Input Pool Controller**

"Receiver Options" From **Send Controller**

"Sending successful" From **Send Controller**

"Sending partially successful" From **Send Controller**

"Sending not successful" From **Send Controller**

"Initialize new behavior instance (layer) for macro" From **Individual Behavior/SBD Interpreter**

"initialize new behavior instance for time-out guard" From **Individual Behavior/SBD Interpreter**

"initialize new behavior instance for choice segment path" From **Individual Behavior/SBD Interpreter**

"Result of Function Execution" From Execution Environment (Function Execution & user interaction)

"Failed to execute" From Execution Environment (Function Execution & user interaction)

"User-Cancel" From Execution Environment (Function Execution & user interaction)

"User-choice of receiver" From Execution Environment (Function Execution & user interaction)

"User-Choice Data Mapping" From Execution Environment (Function Execution & user interaction)

"User-Choice continue after failed sending" From Execution Environment (Function Execution & user interaction)

"User-Choice Message Receive" From Execution Environment (Function Execution & user interaction)

"User-Choice Do" From Execution Environment (Function Execution & user interaction)

"injection instructions" From **Behavior Execution Arbitrator**

Complete Subject Behavior Diagram SBD_9_SID_1_FullySpecifiedSubject_505

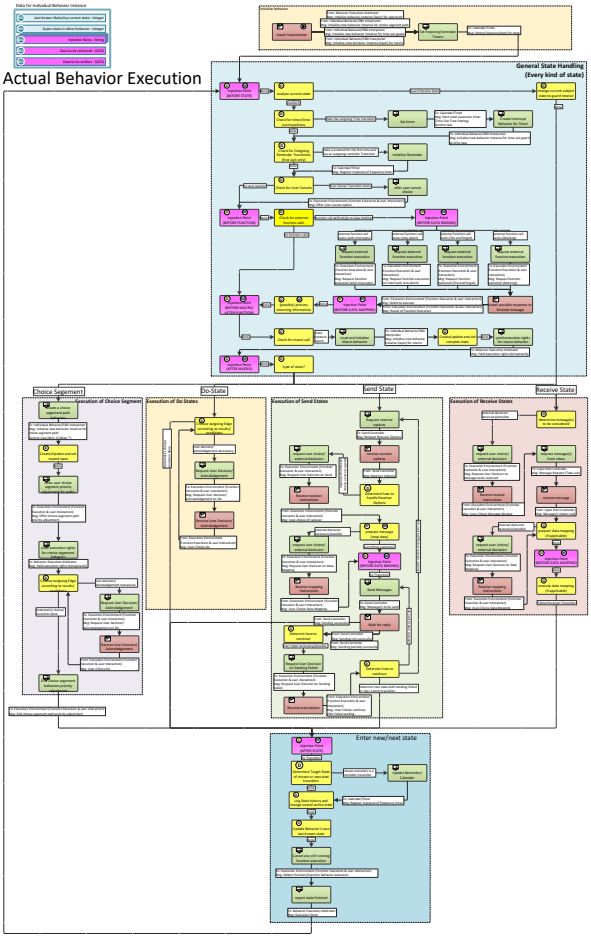

Figure 3: Subject Behavior for [Individual Behavior/SBD Interpreter]

Behavior Execution Arbitrator in SID 1

Figure 4: **Behavior Execution Arbitrator**

Extends relation:

This subject takes part in hierarchical subject extension tree (it is extended by another subject).

In the following tree, the current subject is marked with a star (*):

---------- Behavior Execution Arbitrator <-- (*)

|--------- Guard: Arbitrator - External Priority Adjustment

|--------- Guard Arbitrator Injections Handling

|--------- Guard Arbitrator: create-new ad-hoc extension layer

|--------- Guard Arbitrator: End Behavior Request

Subject behavior:

This subject is connected with a Subject Behavior Diagram. The SBD is displayed on a following page.

Functions States:

Intialize data and official state for subject

End Subject Terminated

Choose behavior for execution

Comment: Depends on the which behavior respondet and which of those has the highest priority

External function call/injection behavior active?

Execution Mode?

Write to Error log: behavior controler not responsive

Injection Point (BEFORE SUBJECT TERMINATION)

Comment: May contain various injected behaviors, priority needs to be established, default is first injected highes priority.

Injection Point (BEFORE SUBJECT INITIALZATION)

Comment: May contain various injected behaviors, priority needs to be established, default is first injected highes priority.

Receiving States:

Receive Model

Reveive Answers

check for subject termination

continue von blocking finished

Receive Callback or time-out

Receive Callback or time-out

Sending States:

Initialize interpreters for all behaviors

Intialize Input Pool Controler

Query all behaviors for executability

Inform evoironment about current state

grant permission (time slice or step)

Outgoing messages:

"Current State (end or not)" To **Execution Environment**

"Initialize behavior instance (layer) for execution" To **Individual Behavior/SBD Interpreter**

"Query: can execute?" To **Individual Behavior/SBD Interpreter**

"Execute" To **Individual Behavior/SBD Interpreter**

"Input pool constraints" To **Input Pool Controller**

"injection instructions" To **Individual Behavior/SBD Interpreter**

Receiving messages:

"Valid Model for execution" From **Execution Environment**

"Question: Can subject be terminated?" From **Execution Environment**

"Reply: Can execute/can not execute" From **Individual Behavior/SBD Interpreter**

"Execution Done" From **Individual Behavior/SBD Interpreter**

"Yield execution rights (temporarily)" From **Individual Behavior/SBD Interpreter**

"External ad-hoc layer priority adjustment" From **Execution Environment (Function Execution & user interaction)**

"Non-interruptable function call/injection behavior finished" From **Execution Environment (Function Execution & user interaction)**

"terminate subject instance" From **Execution Environment**

"Choice Segment Choice (Priority Adjustment)" From **Execution Environment (Function Execution & user interaction)**

"Ad-hoc model extension (behavior)" From **Execution Environment (Function Execution & user interaction)**

"injection specification (Extensions)" From **Execution Environment**

"Yield execution rights (temporarily)" From **Injection Call Check Global Macro**

Complete Subject Behavior Diagram SBD_6_SID_1_FullySpecifiedSubject_406

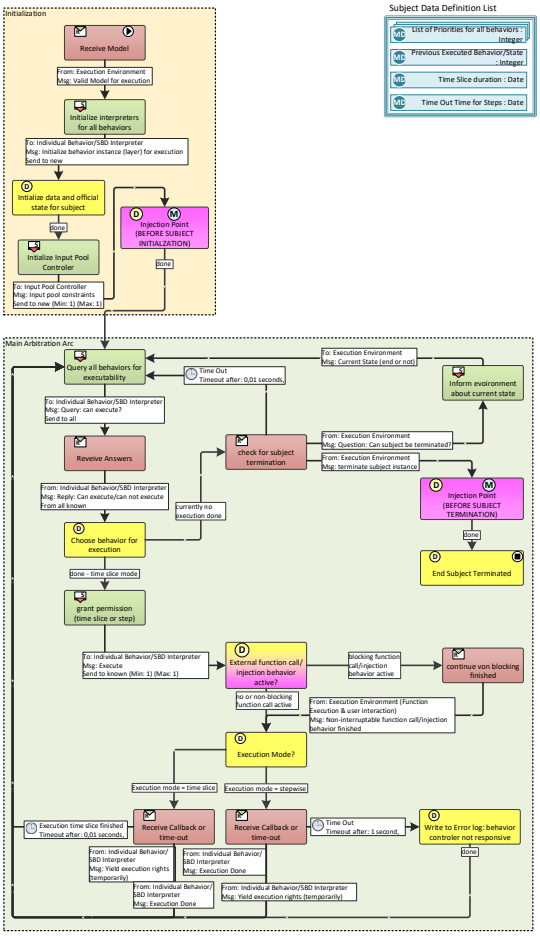

Figure 5: Subject Behavior for Behavior Execution Arbitrator

Calendar/Timer in SID 1

Figure 6: **Calendar/Timer**

Extends relation:

This subject takes part in hierarchical subject extension tree (it is extended by another subject).

In the following tree, the current subject is marked with a star (*):

---------- Calendar/Timer <-- (*)

|--------- Guard Calendar: Timer Transition Registration Guard

Subject behavior:

This subject is connected with a Subject Behavior Diagram. The SBD is displayed on a following page.

Functions States:

Count down time-out time

Comment: This check is a simple time-out has reached 0 or date has been reached. Which of the variables is been used depends on type of time-out (seconds/days/business days/fixed date)

End

continiously check if frequency has time-out/ calendar date has been reached again

Comment: If a continues ReminderTransition is chosen, this timer subject will be active for the whol duration of the subject instance

Reset Timer/ calculate new time-out date based on given frequency

Comment: Only if applicable (e.g. not with fixed callendarial dates)

temp end for test

Receiving States:

Receive Timer Settings

Sending States:

Send Time Out Notice

Send Reminder

Outgoing messages:

"Timer Reached" To **Individual Behavior/SBD Interpreter**

"Place Reminder Message: Frequency Reached" To **Input Pool Controller**

Receiving messages:

"Start state execution timer (Time Out Time Setting)" From **Individual Behavior/SBD Interpreter**

"Setting fequency/date for state" From **Individual Behavior/SBD Interpreter**

"Register traversal of frequency timer" From **Individual Behavior/SBD Interpreter**

Complete Subject Behavior Diagram SBD_8_SID_1_FullySpecifiedSubject_458

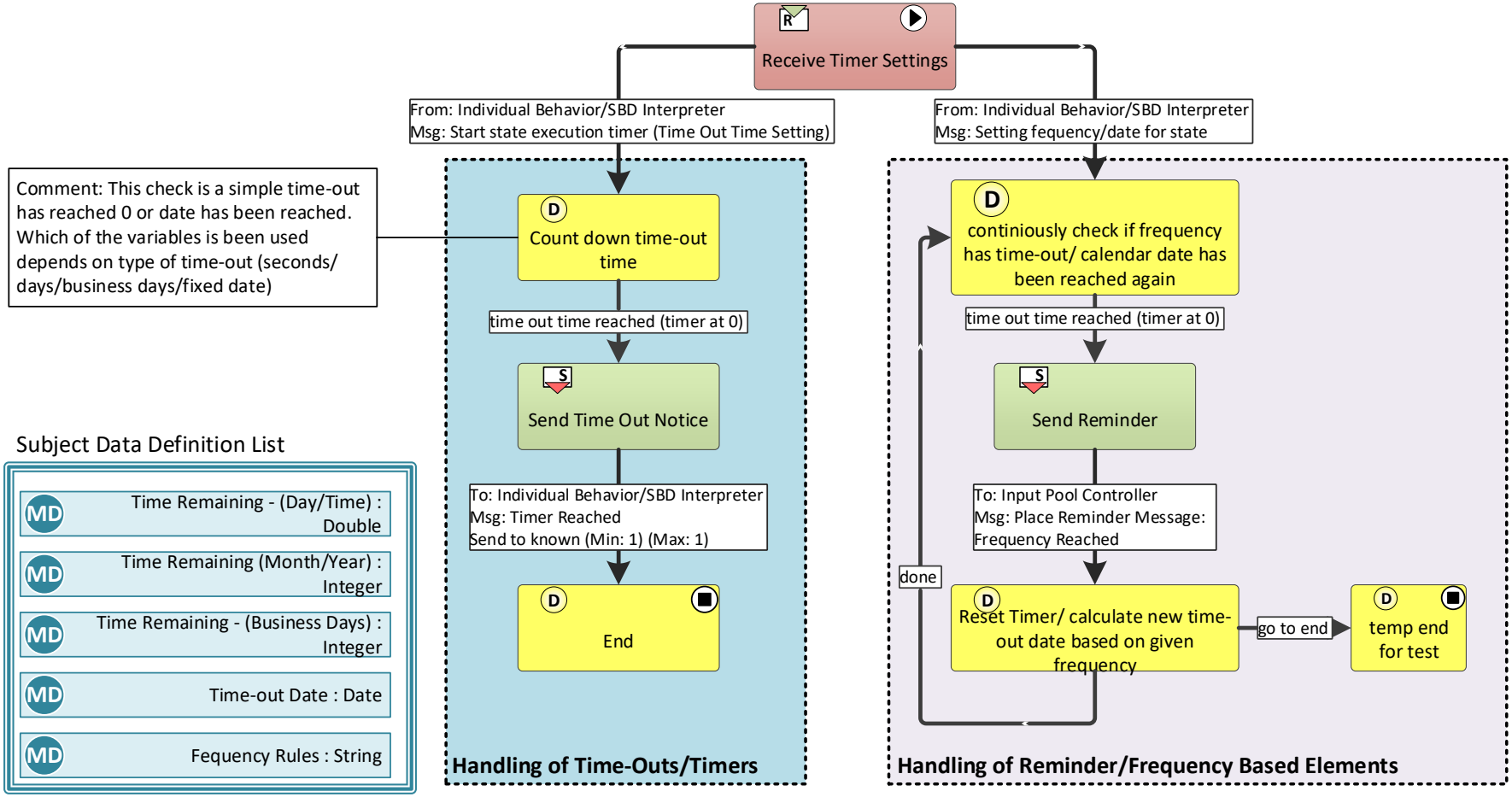

Figure 7: Subject Behavior for Calendar/Timer

Input Pool Controller in SID 1

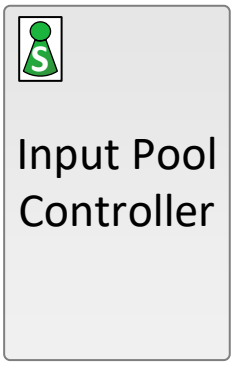

Figure 8: **Input Pool Controller**

Subject behavior:

This subject is connected with a Subject Behavior Diagram. The SBD is displayed on a following page.

Functions States:

Set-Up Input Pool Restrictions

Add Message to input pool

Comment: according to the constraint rules if applicable (e.g. remove older messages)

Verify Input Pool Constraints & Strategy

check input pool for messages

Remove Message/s from Input Pool

temp end

Receiving States:

Get Initialization

Ready

Await request for direct receive

wait for responses

Wait for commit

Wait for commit

Sending States:

Send confirmation

Forward Message

Check for direct receivability

Decline Reception

confirm availability

deny availability

Forward Messages

Send confirmation

Outgoing messages:

"Message/s available" To **Individual Behavior/SBD Interpreter**

"Message/s not available" To **Individual Behavior/SBD Interpreter**

"Message/s (taken out)" To **Individual Behavior/SBD Interpreter**

"Inquiery: can message be received directly" To **Individual Behavior/SBD Interpreter**

"Message accepted" To **Corresponding Subject Send Controller**

"Message declined" To **Corresponding Subject Send Controller**

Receiving messages:

"Input pool constraints" From **Behavior Execution Arbitrator**

"Place Reminder Message: Frequency Reached" From **Calendar/Timer**

"Inquiery: Message(s) available?" From **Individual Behavior/SBD Interpreter**

"Message Request (Take-out)" From **Individual Behavior/SBD Interpreter**

"Message Could be Received" From **Individual Behavior/SBD Interpreter**

"Not in fitting receive State" From **Individual Behavior/SBD Interpreter**

"Message/s" From **Corresponding Subject Send Controller**

"Message Commit" From **Corresponding Subject Send Controller**

"Retract Message (Multi-Send Fail)" From **Corresponding Subject Send Controller**

Complete Subject Behavior Diagram SBD_10_SID_1_FullySpecifiedSubject_552

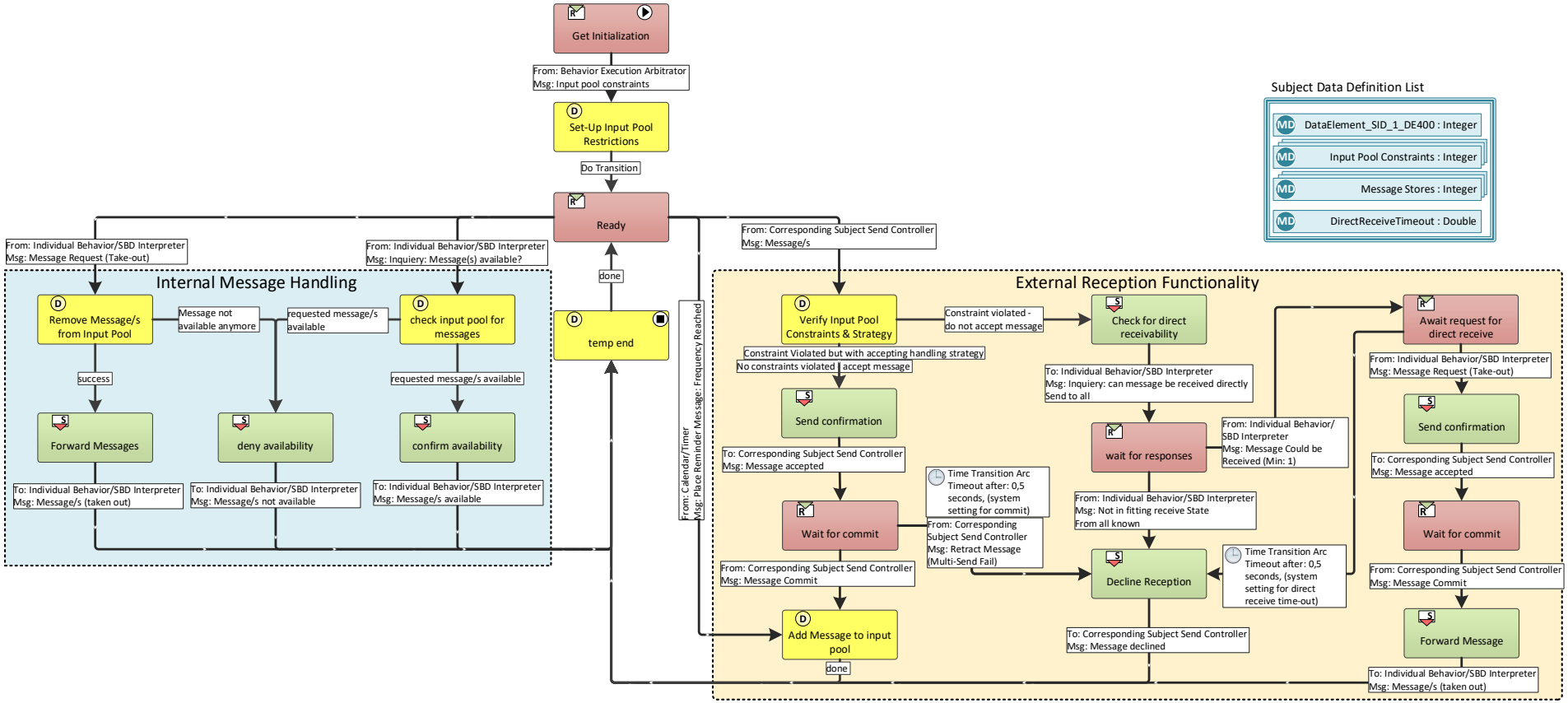

Figure 9: Subject Behavior for [Input Pool Controller]

Send Controller in SID 1

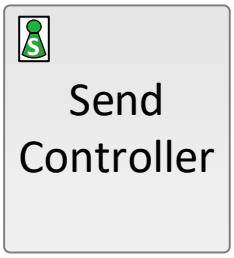

Figure 10: **Send Controller**

Subject behavior:

This subject is connected with a Subject Behavior Diagram. The SBD is displayed on a following page.

Functions States:

Prepare messages/determin message targets (engine-->user/group)

Compile Options

Comment: TODO: When are which information needded, Complex activity

how to continue after multi-send failed

temp End

Receiving States:

Receive Message(s) to be Send

Wait for response

Get resolve

Sending States:

Send messages to receiver inbox

Acknowledge to behavior

Inform behavior about sending problem

Forwad receiver options from behavior

request subject resolve

Retract previously send messages

comit the messages

Inform behavior about sending problem

Outgoing messages:

"Receiver Options" To **Individual Behavior/SBD Interpreter**

"Sending successful" To **Individual Behavior/SBD Interpreter**

"Sending partially successful" To **Individual Behavior/SBD Interpreter**

"Sending not successful" To **Individual Behavior/SBD Interpreter**

"Message/s" To **Corresponding Input Pool Controller**

"Message Commit" To **Corresponding Input Pool Controller**

"Retract Message (Multi-Send Fail)" To **Corresponding Input Pool Controller**

"Request: Sending Options/Address Resolve" To **Execution Environment (Send Resolves)**

Receiving messages:

"Request Receiver Options" From **Individual Behavior/SBD Interpreter**

"Message/s to be send" From **Individual Behavior/SBD Interpreter**

"Message accepted" From **Corresponding Input Pool Controller**

"Message declined" From **Corresponding Input Pool Controller**

"Sending Options" From **Execution Environment (Send Resolves)**

Complete Subject Behavior Diagram SBD_11_SID_1_FullySpecifiedSubject_644

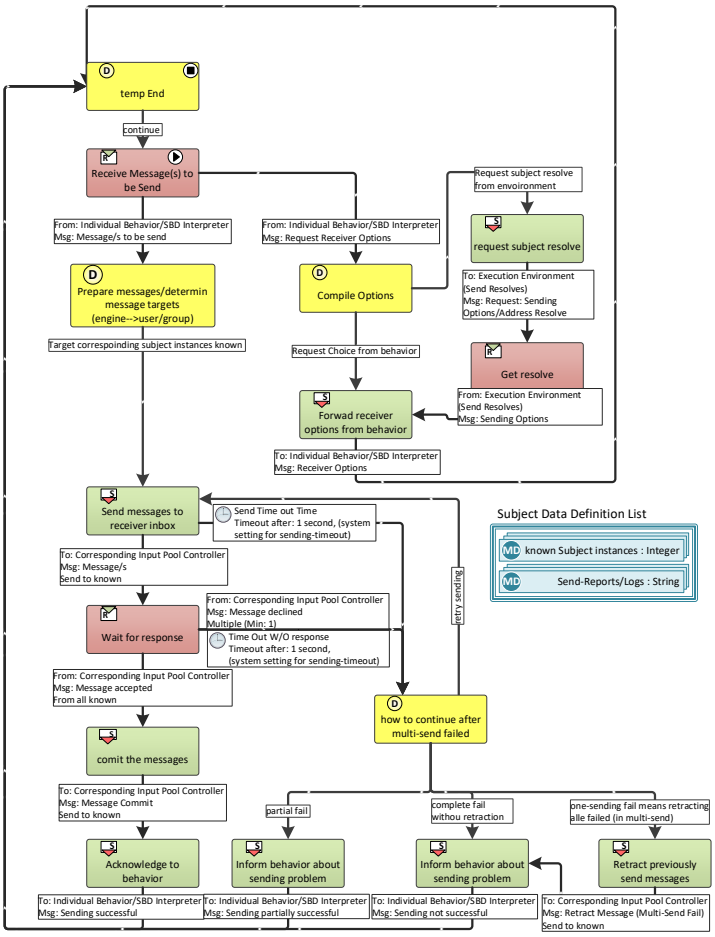

Figure 11: Subject Behavior for Send Controller

Injection Call Check Global Macro in SID 1

Figure 12: Injection Call Check Global Macro

Subject behavior:

This subject is connected with a Subject Behavior Diagram. The SBD is displayed on a following page.

Functions States:

Check for applicable injection instruction

choose injection with highest priority

other Valid injections

Sending States:

Request top priority injection execution

Reques injection execution (abort only)

Reques injection execution (blocking)

yield execution rights

Reques injection execution (with interrupts)

Outgoing messages:

"Request injection behavior execution (blocking)" To **Execution Environment (Function Execution & user interaction)**

"Request injection behavior execution (with interrupts)" To **Execution Environment (Function Execution & user interaction)**

"Request injection behavior execution (no Interrupts only abort)" To **Execution Environment (Function Execution & user interaction)**

"Request injection behavior execution (fire and forget)" To **Execution Environment (Function Execution & user interaction)**

"Yield execution rights (temporarily)" To **Behavior Execution Arbitrator**

Complete Subject Behavior Diagram MBD_54_SID_8_StandAloneMacroSubject_1430

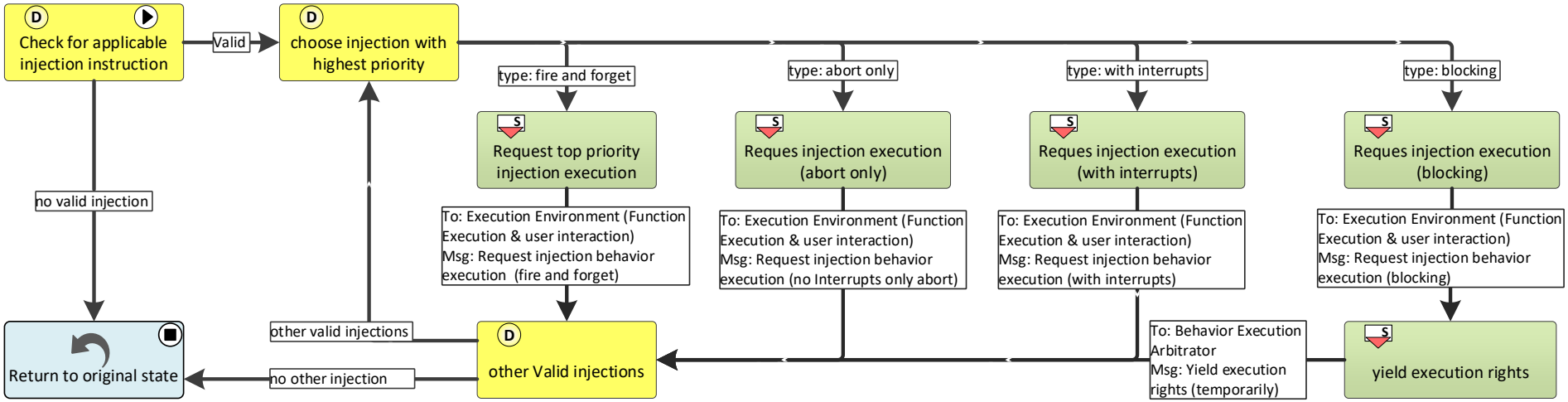

Figure 13: Subject Behavior for Injection Call Check Global Macro

Interface Subjects & Groups

Reminder: interface subjects are actors without a defined behavior within the bounds of a given model. Defining no behavior diagram may have various reasons: the behavior may be defined in another process model, the subject maybe a technical system only reacting towards request but without a complex process flow, or simply because it is not important or impossible to describe how message are created within the model.

Execution Environment

Figure 14: SID_1_InterfaceSubject_268

External Execution Environments

Figure 15: SID_1_InterfaceSubject_313

Model Verificator

Figure 16: SID_1_InterfaceSubject_361

Corresponding Subject Send Controller

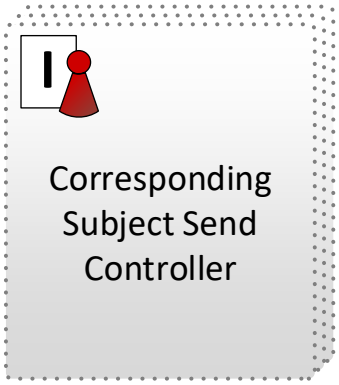

Figure 17: SID_1_InterfaceSubject_599

Corresponding Input Pool Controller

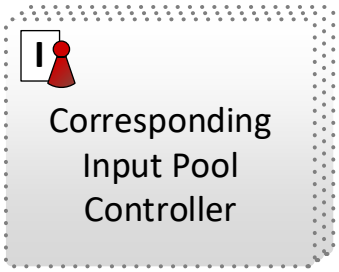

Figure 18: SID_1_InterfaceSubject_691

Execution Environment (Function Execution & user interaction)

Figure 19: SID_1_InterfaceSubject_763

Execution Environment (Send Resolves)

Figure 20: SID_1_InterfaceSubject_808

Subject Data Controller

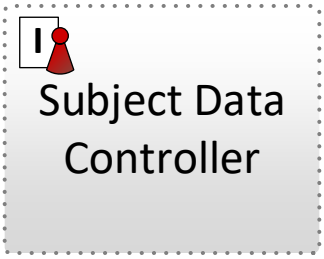

Figure 21: SID_1_InterfaceSubject_1283

Comment: Handels Data of Subject as defined in interpereted model as well as the technical data of this subject instance

Injected Behavior Interperter Machines

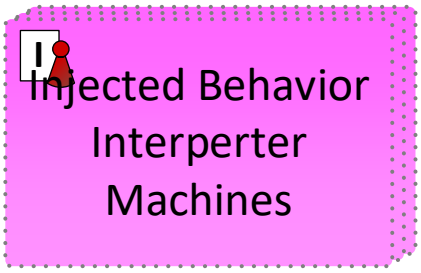

Figure 22: SID_1_FullySpecifiedSubject_1329

Comment: mainly function call injection

SID Guards 1

Subject Interaction Diagram:

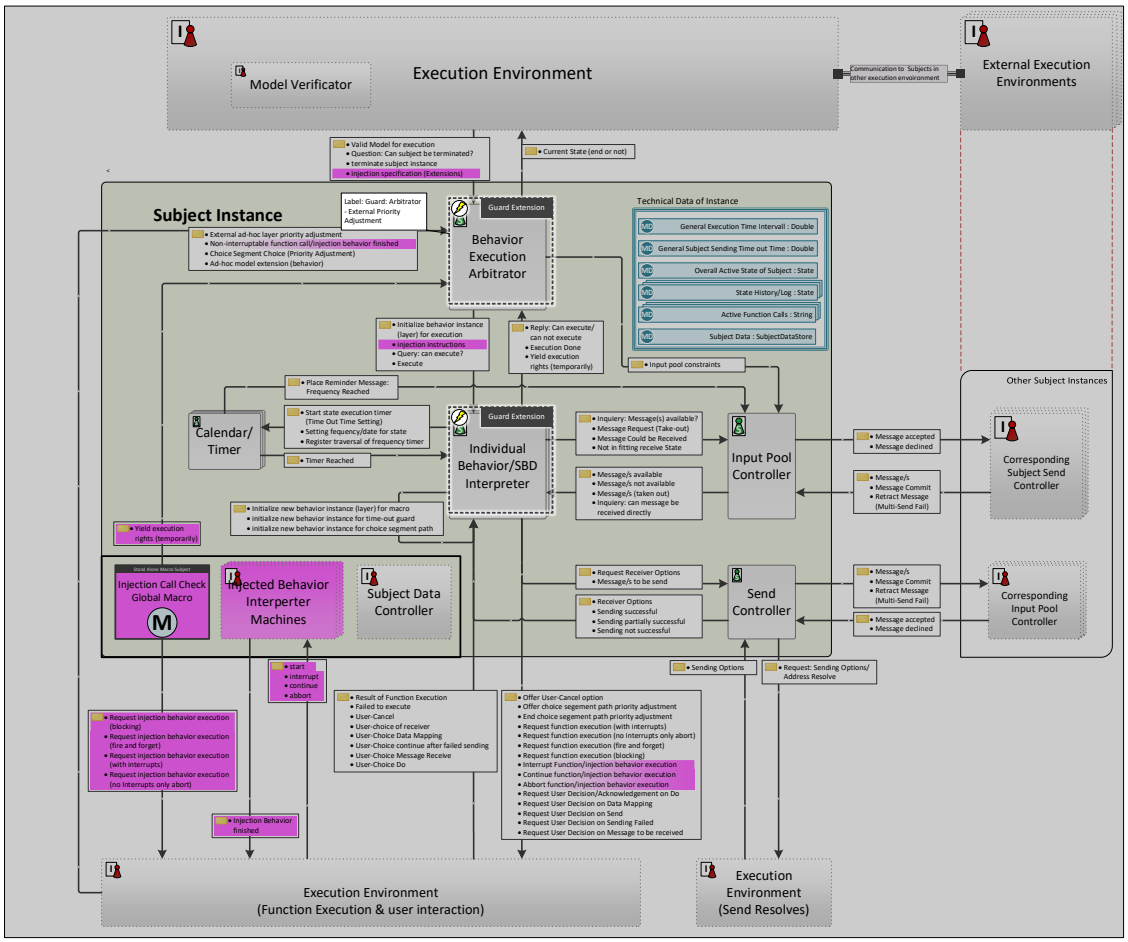

Figure 23: Subject Behavior for Report for Process: 2024-02-16-Recursive Execution Model for PASS - with injections

Subject Short Description

The areas of activity described in the model represent the principal aspects necessary for the holistic execution of strategic product planning.

There are 2 subjects **being part of SID Guards 1:**

Guard: Arbitrator - External Priority Adjustment

Guard Interpreter: Direct Excutability

Subjects and Their Internal Behavior

In this section, each subject from the subject interaction diagram is individually presented.

Guard: Arbitrator - External Priority Adjustment in SID Guards 1

Figure 24: **Guard: Arbitrator - External Priority Adjustment**

Extends relation:

This subject takes part in hierarchical subject extension tree (it extends another subject).

All attributes listed here only belong to the extending subject. **Other attributes can be found on the extended subject's page. (Behavior Execution Arbitrator)**

In the following tree, the current subject is marked with a star (*):

---------- **Behavior Execution Arbitrator**

|--------- Guard: Arbitrator - External Priority Adjustment <-- (*)

|--------- **Guard Arbitrator Injections Handling**

|--------- **Guard Arbitrator: create-new ad-hoc extension layer**

|--------- **Guard Arbitrator: End Behavior Request**

Subject behavior:

This subject is connected with a Subject Behavior Diagram. The SBD is displayed on a following page.

Functions States:

adjust priorities

Complete Subject Behavior Diagram GBD_15_SID_1_GuardExtension_3

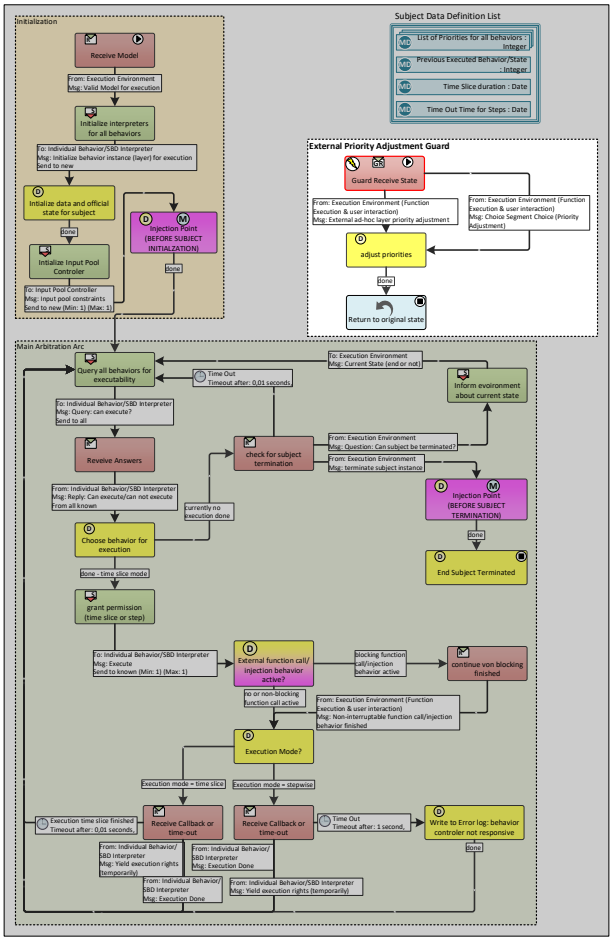

Figure 25: Subject Behavior for Guard: Arbitrator - External Priority Adjustment

Guard Interpreter: Direct Excutability in SID Guards 1

Figure 26: **Guard Interpreter: Direct Excutability**

Extends relation:

This subject takes part in hierarchical subject extension tree (it extends another subject).

All attributes listed here only belong to the extending subject. **Other attributes can be found on the extended subject's page. (Individual Behavior/SBD Interpreter)**

In the following tree, the current subject is marked with a star (*):

---------- **Individual Behavior/SBD Interpreter**

|--------- Guard Interpreter: Direct Excutability <-- (*)

|--------- **Guard Injections Handling**

|--------- **Guard Timer Transition Handling**

|--------- **Guard Interpreter: User Cancel**

|--------- **Macro Check Executability**

|--------- **Guard Interpreter: Arbitrator interatction**

Subject behavior:

This subject is connected with a Subject Behavior Diagram. The SBD is displayed on a following page.

Functions States:

Check for direct receiveability

Sending States:

afirm receivability

deny afirmability

Complete Subject Behavior Diagram GBD_21_SID_1_GuardExtension_9

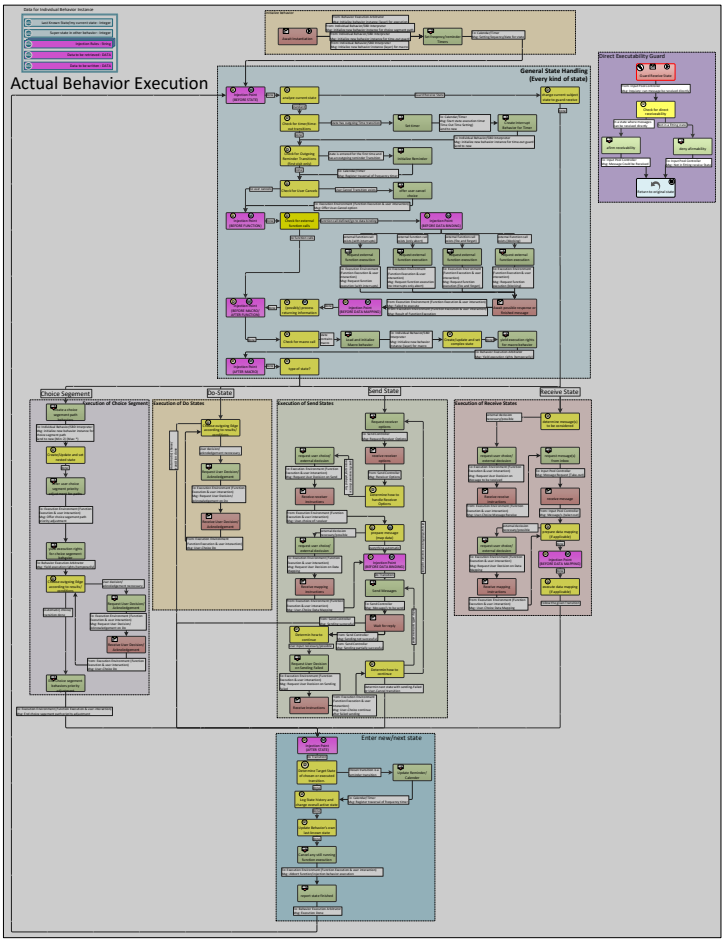

Figure 27: Subject Behavior for **Guard Interpreter: Direct Excutability**

SID Guards Injection Handling

Subject Interaction Diagram:

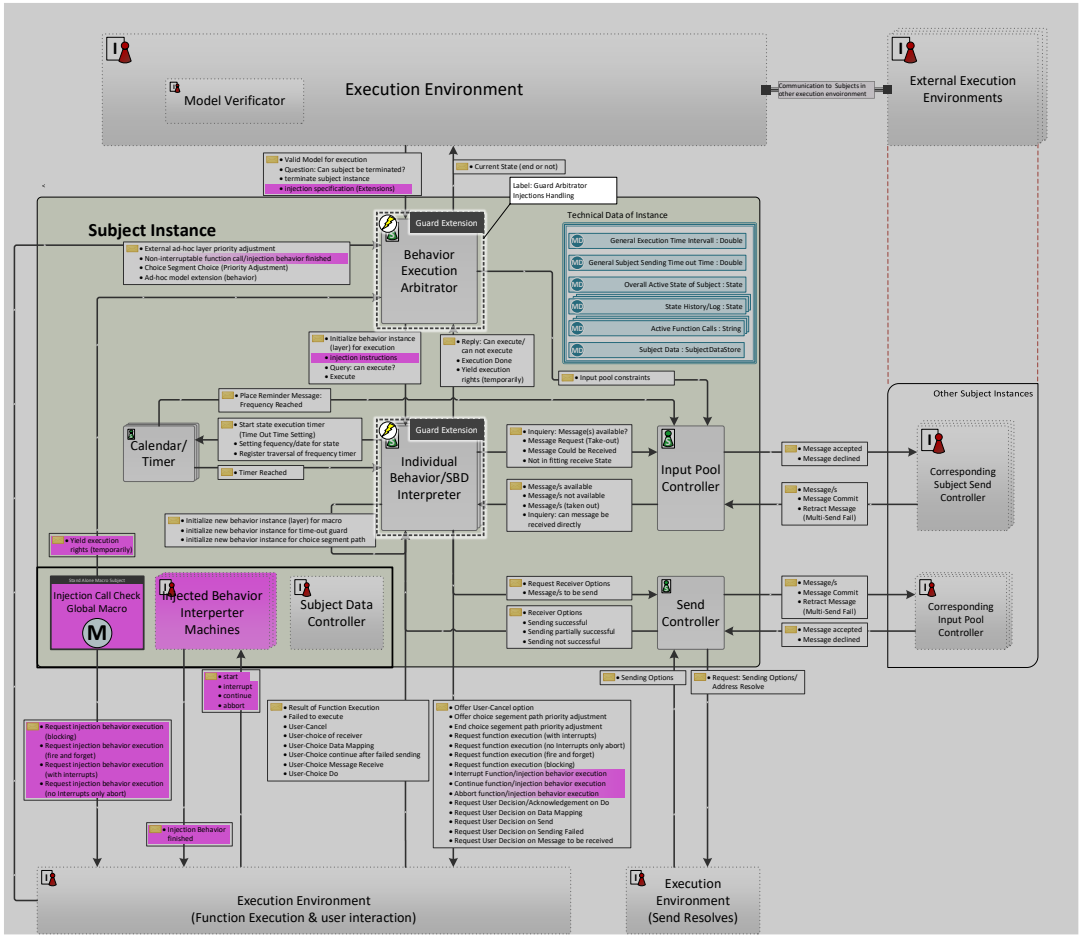

Figure 28: Subject Behavior for Report for Process: 2024-02-16-Recursive Execution Model for PASS - with injections

Subject Short Description

The areas of activity described in the model represent the principal aspects necessary for the holistic execution of strategic product planning.

There are 2 subjects **being part of SID Guards Injection Handling**:

- **Guard Injections Handling**
- **Guard Arbitrator Injections Handling**

Subjects and Their Internal Behavior

In this section, each subject from the subject interaction diagram is individually presented.

Guard Injections Handling in SID Guards Injection Handling

Figure 29: **Guard Injections Handling**

Extends relation:

This subject takes part in hierarchical subject extension tree (it extends another subject).

All attributes listed here only belong to the extending subject. **Other attributes can be found on the extended subject's page. (Individual Behavior/SBD Interpreter)**

In the following tree, the current subject is marked with a star (*):

---------- **Individual Behavior/SBD Interpreter**

|--------- **Guard Interpreter: Direct Excutability**

|--------- Guard Injections Handling <-- (*)

|--------- **Guard Timer Transition Handling**

|--------- **Guard Interpreter: User Cancel**

|--------- **Macro Check Executability**

|--------- **Guard Interpreter: Arbitrator interatction**

Subject behavior:

This subject is connected with a Subject Behavior Diagram. The SBD is displayed on a following page.

Functions States:

Save injection instrucitons

Complete Subject Behavior Diagram GBD_50_SID_1_GuardExtension_3

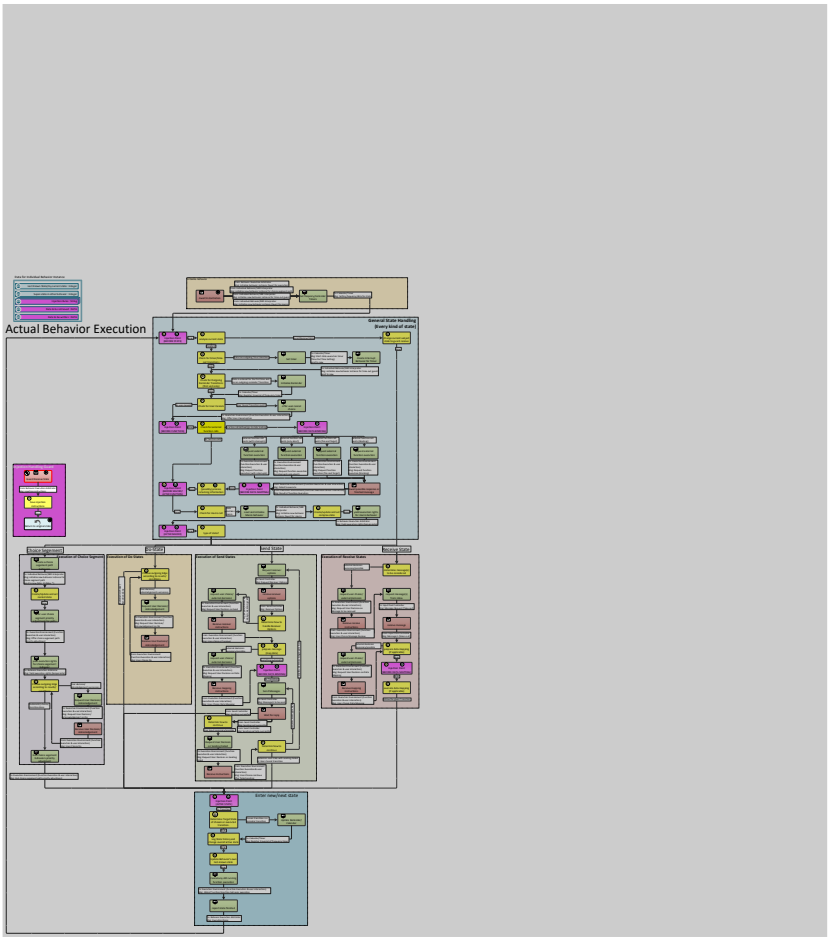

Figure 30: Subject Behavior for **Guard Injections Handling**

Guard Arbitrator Injections Handling in SID Guards Injection Handling

Figure 31: Guard Arbitrator Injections Handling

Extends relation:

This subject takes part in hierarchical subject extension tree (it extends another subject).

All attributes listed here only belong to the extending subject. **Other attributes can be found on the extended subject's page. (Behavior Execution Arbitrator)**

In the following tree, the current subject is marked with a star (*):

---------- **Behavior Execution Arbitrator**

|--------- **Guard: Arbitrator - External Priority Adjustment**

|--------- Guard Arbitrator Injections Handling <-- (*)

|--------- **Guard Arbitrator: create-new ad-hoc extension layer**

|--------- **Guard Arbitrator: End Behavior Request**

Subject behavior:

This subject is connected with a Subject Behavior Diagram. The SBD is displayed on a following page.

Functions States:

(?)Check for Validity of Injection Instrcution

Sending States:

Inject valid instructions

Complete Subject Behavior Diagram GBD_51_SID Guards User Cancel_GuardExtension_7

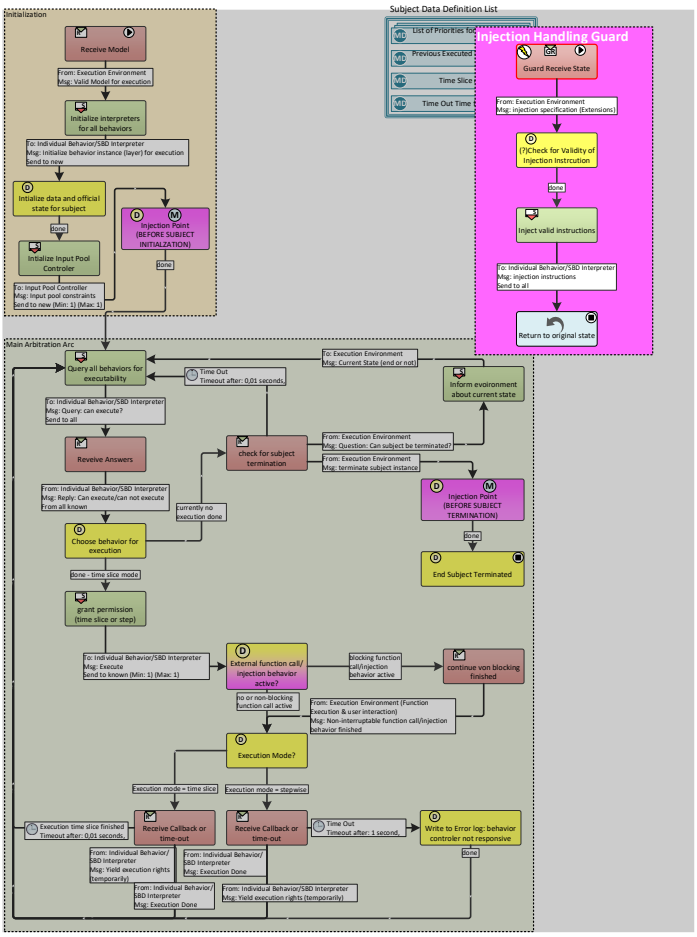

Figure 32: Subject Behavior for Guard Arbitrator Injections Handling

SID Guards Timer and Ad Hoc

Subject Interaction Diagram:

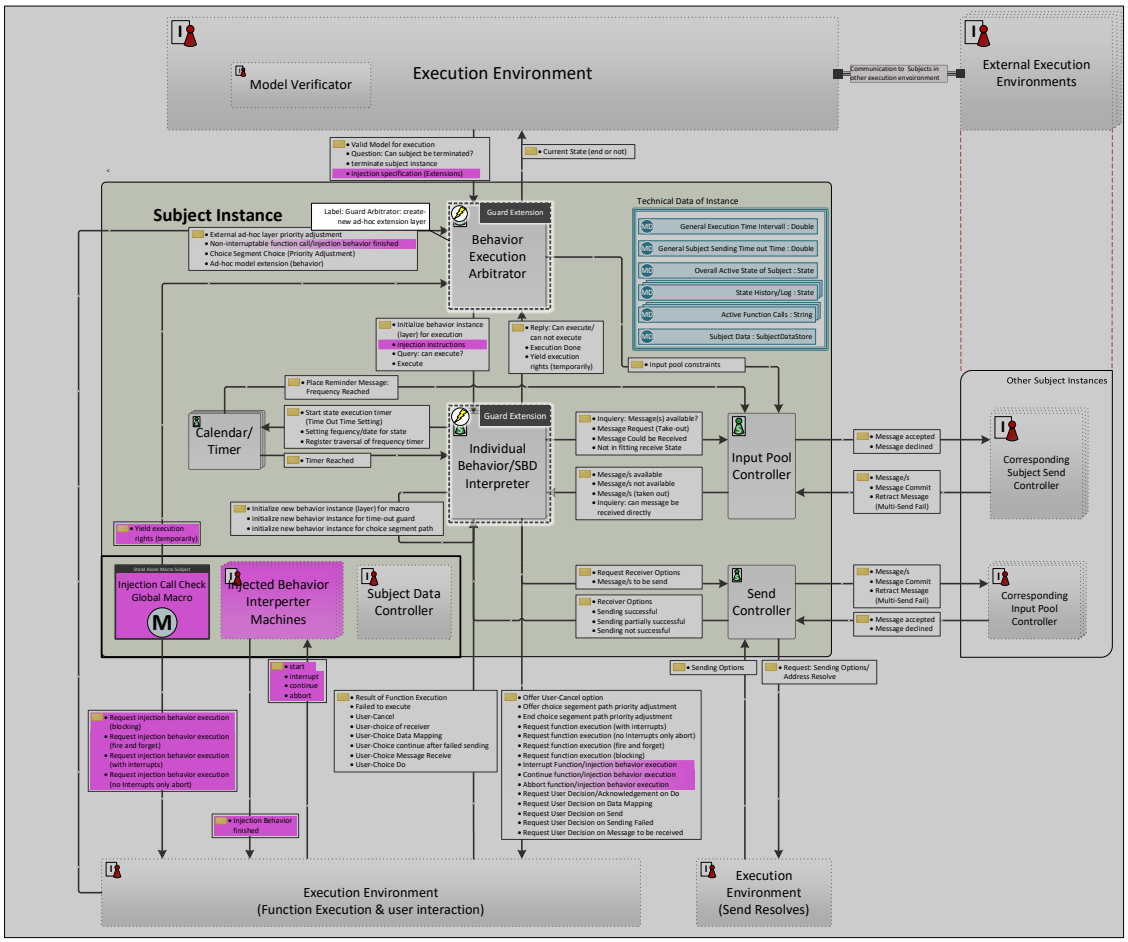

Figure 33: Subject Behavior for Report for Process: 2024-02-16-Recursive Execution Model for PASS - with injections

Subject Short Description

The areas of activity described in the model represent the principal aspects necessary for the holistic execution of strategic product planning.

There are 2 subjects **being part of SID Guards Timer and Ad Hoc:**

Guard Timer Transition Handling

Guard Arbitrator: create-new ad-hoc extension layer

Subjects and Their Internal Behavior

In this section, each subject from the subject interaction diagram is individually presented.

Guard Timer Transition Handling in SID Guards Timer and Ad Hoc

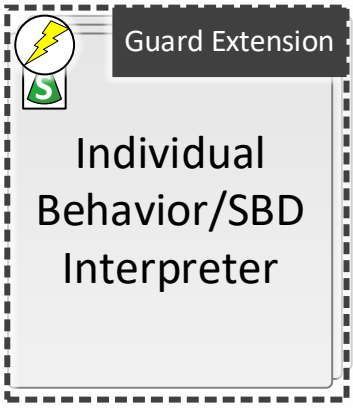

Figure 34: **Guard Timer Transition Handling**

Extends relation:

This subject takes part in hierarchical subject extension tree (it extends another subject).

All attributes listed here only belong to the extending subject. **Other attributes can be found on the extended subject's page. (Individual Behavior/SBD Interpreter)**

In the following tree, the current subject is marked with a star (*):

---------- **Individual Behavior/SBD Interpreter**

|--------- **Guard Interpreter: Direct Excutability**

|--------- **Guard Injections Handling**

|--------- Guard Timer Transition Handling <-- (*)

|--------- **Guard Interpreter: User Cancel**

|--------- **Macro Check Executability**

|--------- **Guard Interpreter: Arbitrator interatction**

Subject behavior:

This subject is connected with a Subject Behavior Diagram. The SBD is displayed on a following page.

Functions States:

check current offical state

Complete Subject Behavior Diagram GBD_23_SID_1_GuardExtension_3

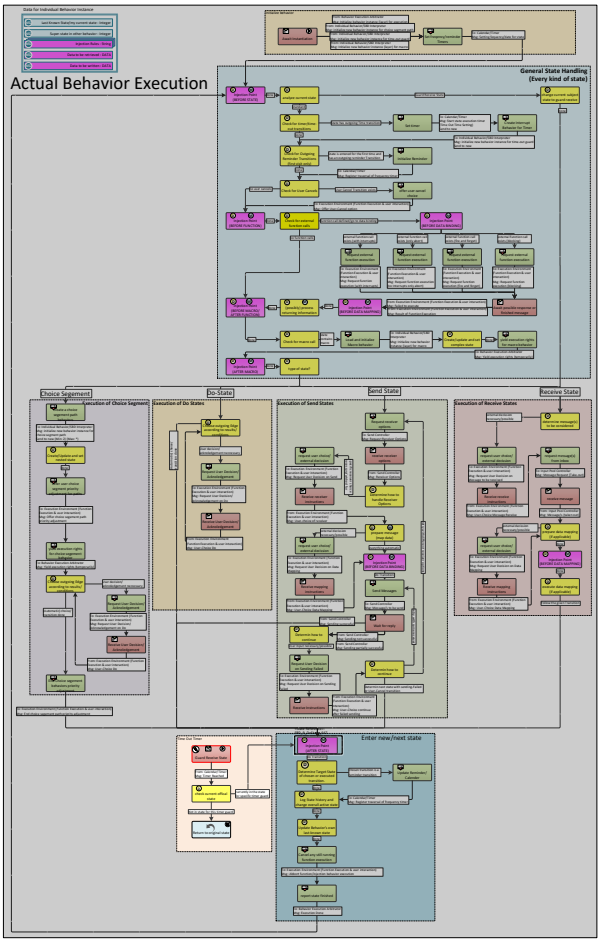

Figure 35: Subject Behavior for Guard Timer Transition Handling

Guard Arbitrator: create-new ad-hoc extension layer in SID Guards Timer and Ad Hoc

Figure 36: **Guard Arbitrator: create-new ad-hoc extension layer**

Extends relation:

This subject takes part in hierarchical subject extension tree (it extends another subject).

All attributes listed here only belong to the extending subject. **Other attributes can be found on the extended subject's page. (Behavior Execution Arbitrator)**

In the following tree, the current subject is marked with a star (*):

---------- **Behavior Execution Arbitrator**

|--------- **Guard: Arbitrator - External Priority Adjustment**

|--------- **Guard Arbitrator Injections Handling**

|--------- Guard Arbitrator: create-new ad-hoc extension layer <-- (*)

|--------- **Guard Arbitrator: End Behavior Request**

Subject behavior:

This subject is connected with a Subject Behavior Diagram. The SBD is displayed on a following page.

Sending States:

create and add new extension behavior

Complete Subject Behavior Diagram GBD_36_SID Guards Timer and Ad Hoc_GuardExtension_8

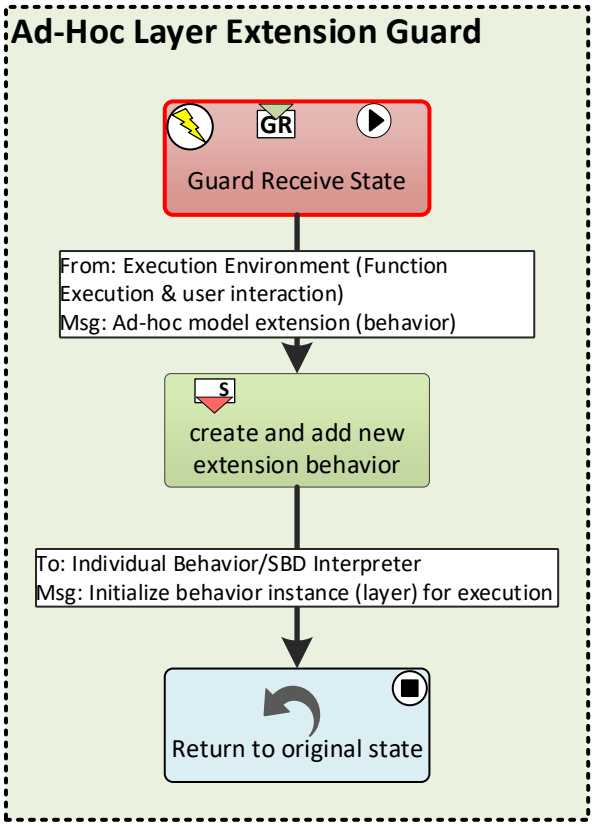

Figure 37: Subject Behavior for Guard Arbitrator: create-new ad-hoc extension layer

SID Guards User Cancel

Subject Interaction Diagram:

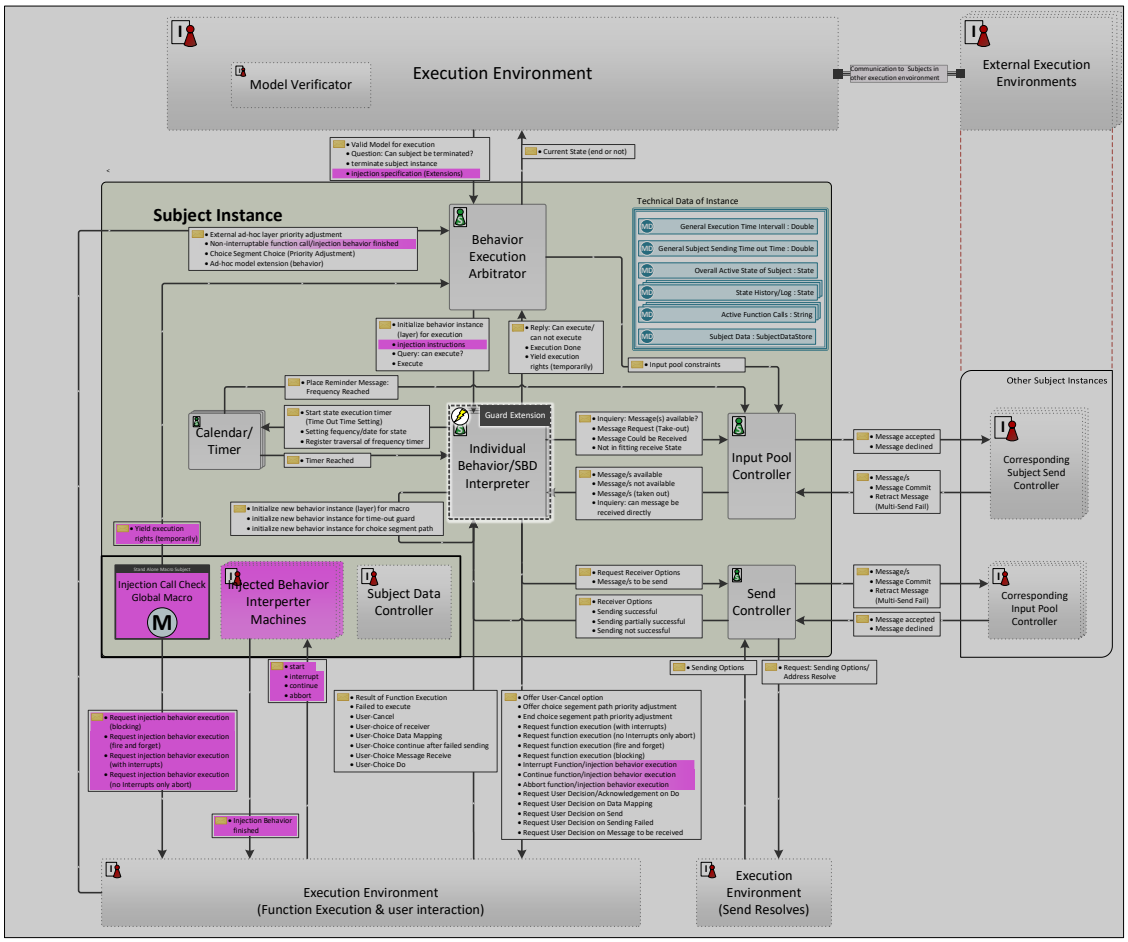

Figure 38: Subject Behavior for Report for Process: 2024-02-16-Recursive Execution Model for PASS - with injections

Subject Short Description

The areas of activity described in the model represent the principal aspects necessary for the holistic execution of strategic product planning.

There is 1 subject **being part of SID Guards User Cancel:**

Guard Interpreter: User Cancel

Subjects and Their Internal Behavior

In this section, each subject from the subject interaction diagram is individually presented.

Guard Interpreter: User Cancel in SID Guards User Cancel

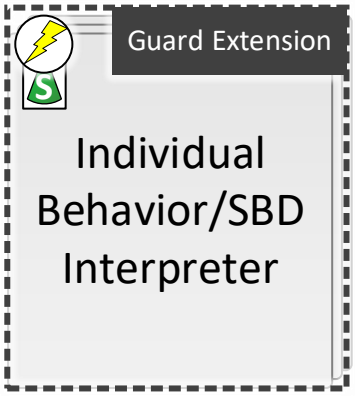

Figure 39: **Guard Interpreter: User Cancel**

Extends relation:

This subject takes part in hierarchical subject extension tree (it extends another subject).

All attributes listed here only belong to the extending subject. **Other attributes can be found on the extended subject's page. (Individual Behavior/SBD Interpreter)**

In the following tree, the current subject is marked with a star (*):

---------- **Individual Behavior/SBD Interpreter**

|--------- **Guard Interpreter: Direct Excutability**

|--------- **Guard Injections Handling**

|--------- **Guard Timer Transition Handling**

|--------- Guard Interpreter: User Cancel <-- (*)

|--------- **Macro Check Executability**

|--------- **Guard Interpreter: Arbitrator interatction**

Subject behavior:

This subject is connected with a Subject Behavior Diagram. The SBD is displayed on a following page.

Complete Subject Behavior Diagram GBD_25_SID_1_GuardExtension_3

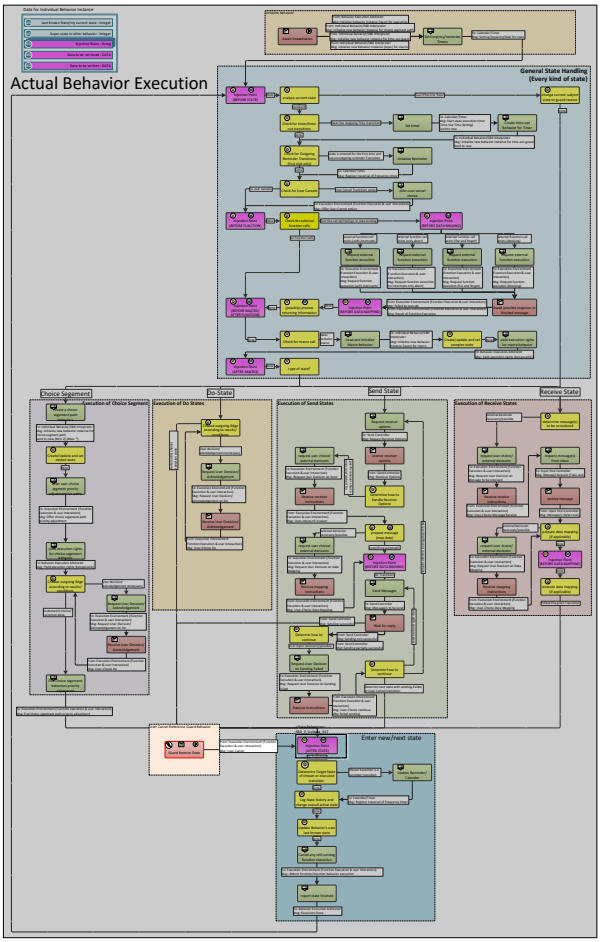

Figure 40: Subject Behavior for **Guard Interpreter: User Cancel**

Executability Macro

Subject Interaction Diagram:

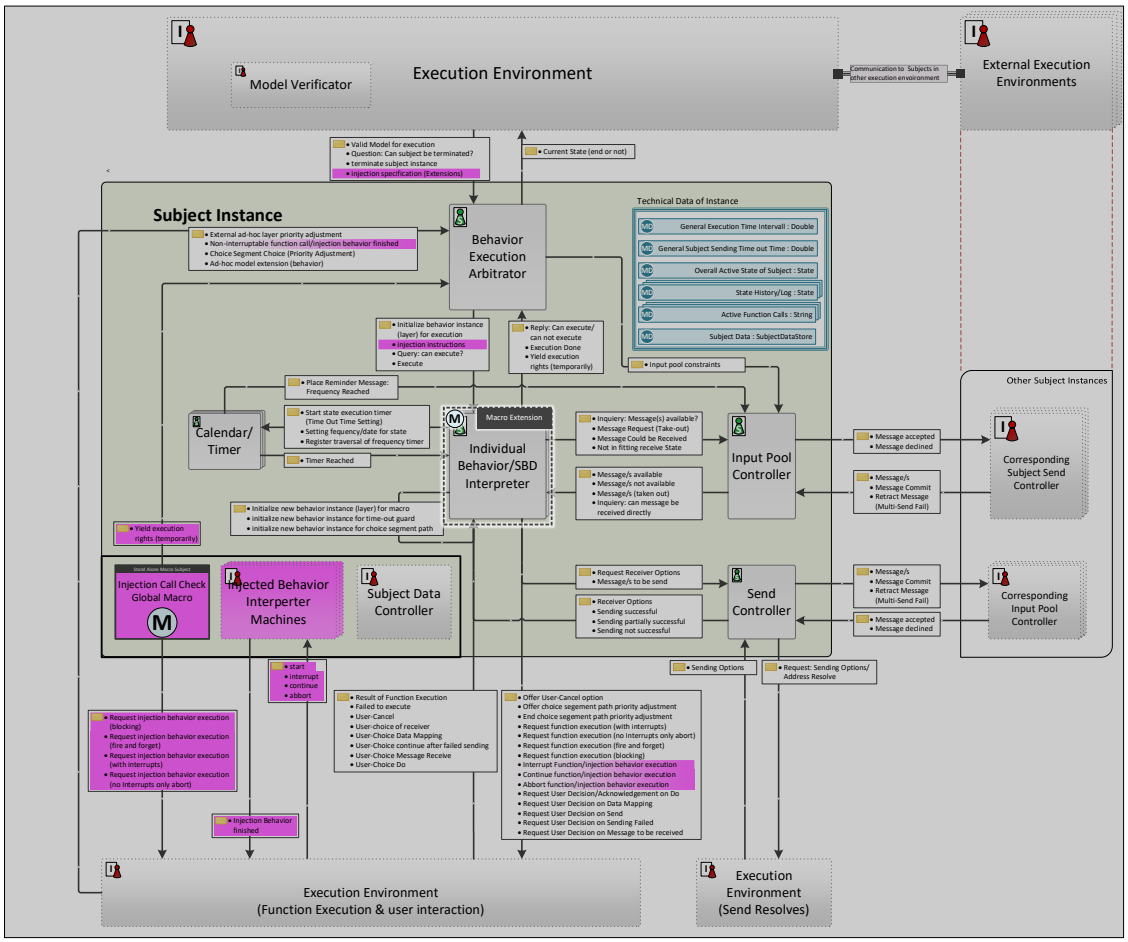

Figure 41: Subject Behavior for Report for Process: 2024-02-16-Recursive Execution Model for PASS - with injections

Subject Short Description

The areas of activity described in the model represent the principal aspects necessary for the holistic execution of strategic product planning.

There is 1 subject **being part of Executability Macro**:

- **Macro Check Executability**

Subjects and Their Internal Behavior

In this section, each subject from the subject interaction diagram is individually presented.

Macro Check Executability in **Executability Macro**

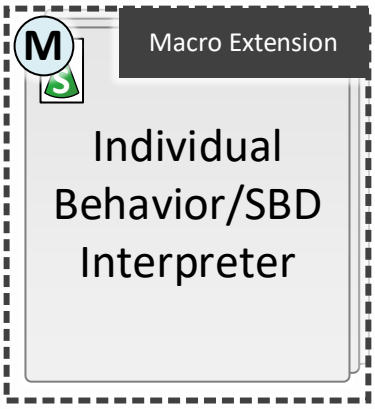

Figure 42: **Macro Check Executability**

Extends relation:

This subject takes part in hierarchical subject extension tree (it extends another subject).

All attributes listed here only belong to the extending subject. **Other attributes can be found on the extended subject's page. (Individual Behavior/SBD Interpreter)**

In the following tree, the current subject is marked with a star (*):

---------- **Individual Behavior/SBD Interpreter**

|--------- **Guard Interpreter: Direct Excutability**

|--------- **Guard Injections Handling**

|--------- **Guard Timer Transition Handling**

|--------- **Guard Interpreter: User Cancel**

|--------- Macro Check Executability <-- (*)

|--------- **Guard Interpreter: Arbitrator interatction**

Subject behavior:

This subject is connected with a Subject Behavior Diagram. The SBD is displayed on a following page.

Functions States:

Is current active state defined in my SBD

Comment: The notion of "current state" is more complex than a single state. For macro and choice segment path beahviors there is the concept of "sub-state"where the subject is in "more than one state" at the same time the calling state or the choice segment and a state in the macro behavior or in each choice-segment-path-behavior individually. Also note that the same state can be defined in multiple behaviors. E.g. in a base and an extension behavior.

type of state?

choice segement path conditions fullfilled?

Comment: path fullfillment conditions: a) all mandatory to end choice path behaviors are in their end behavior. b) from the others: all mandatory to start behaviors have left their "start state" (that has to be created ad-hoc).

type of complex state

Macro-bahavior instance finished?

Comment: in an End-State or not existant anymore

Receiving States:

Receive answer from Input Pool Controler

Sending States:

Check if any messages are available

Complete Subject Behavior Diagram MBD_39_SID_1_SpecificMacro_7

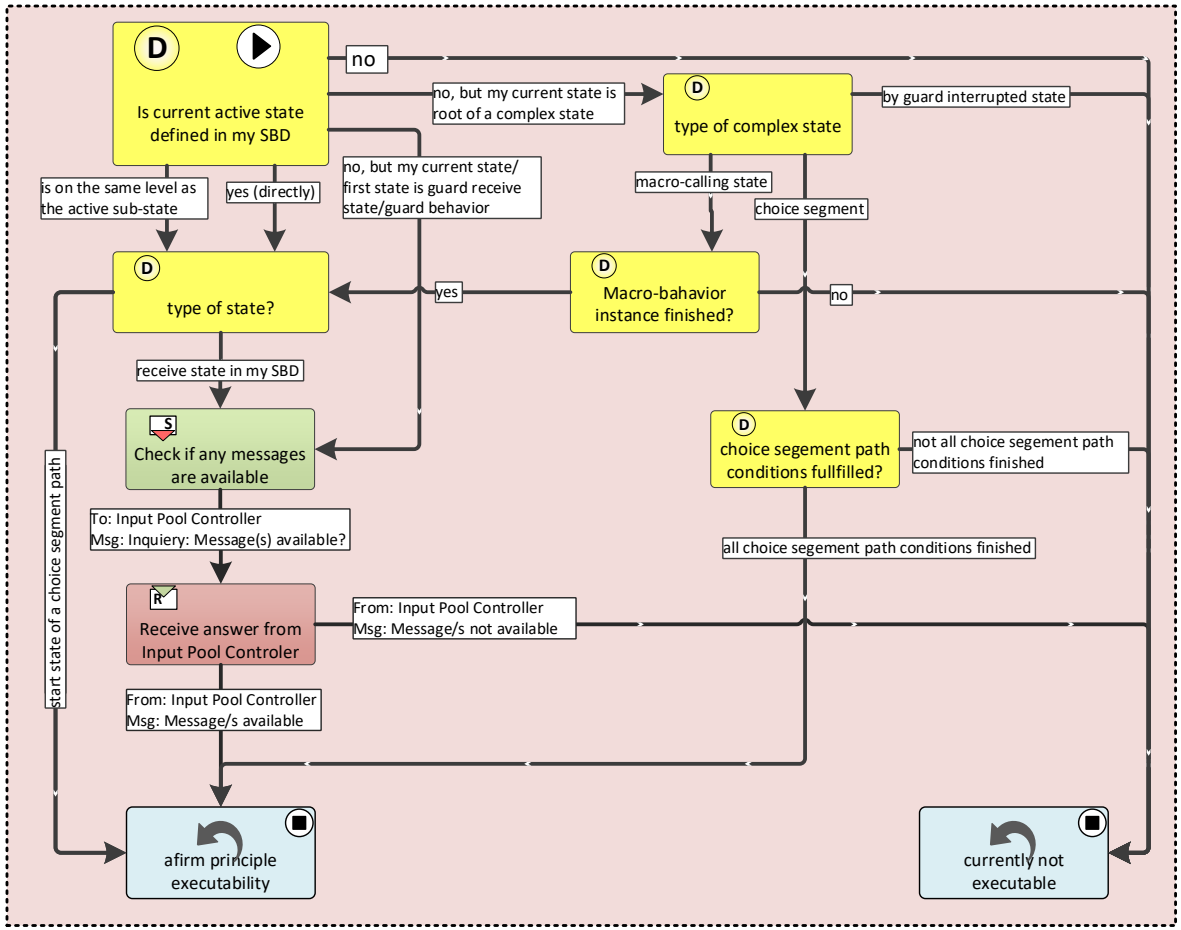

Figure 43: Subject Behavior for [Macro Check Executability]

SID Guards 2

Subject Interaction Diagram:

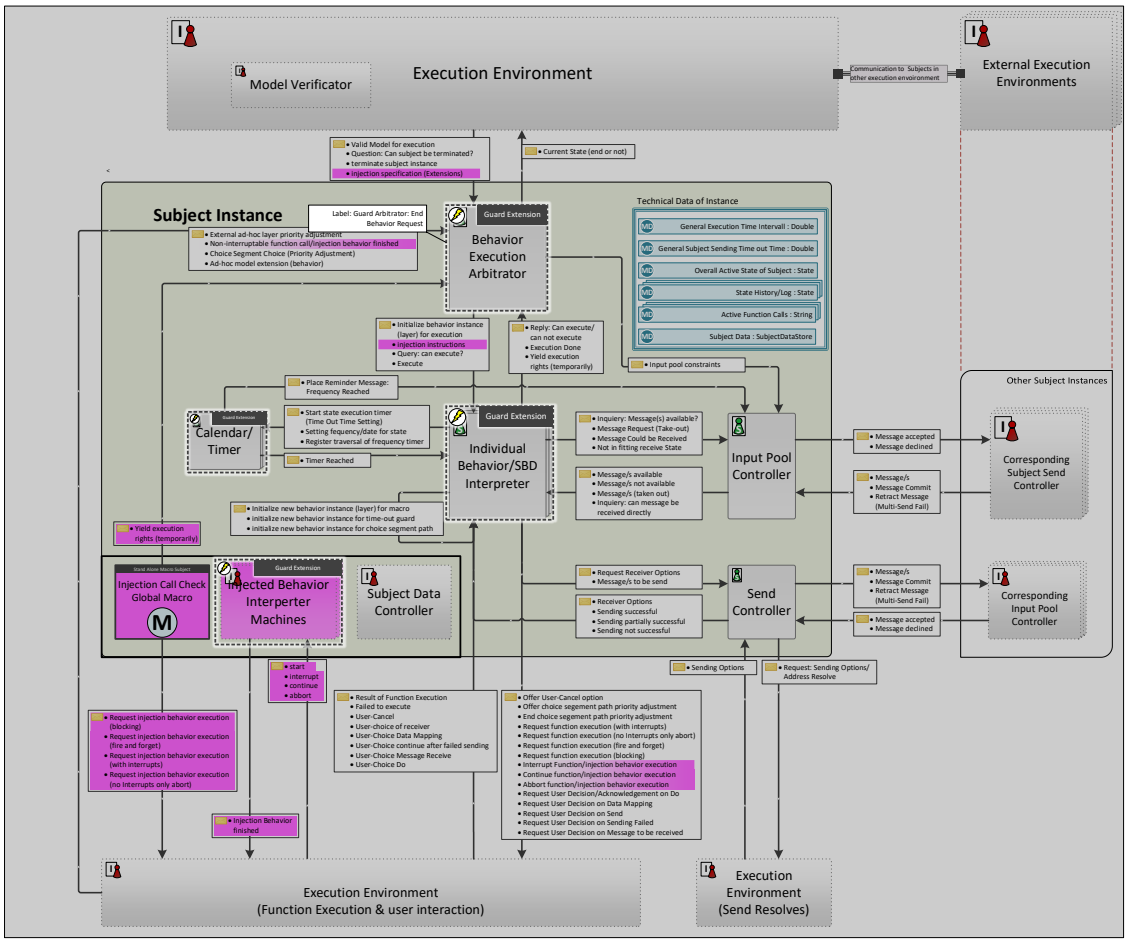

Figure 44: Subject Behavior for Report for Process: 2024-02-16-Recursive Execution Model for PASS - with injections

Subject Short Description

The areas of activity described in the model represent the principal aspects necessary for the holistic execution of strategic product planning.

There are 4 subjects **being part of SID Guards 2**:

Guard Arbitrator: End Behavior Request

Guard Calendar: Timer Transition Registration Guard

Guard Interpreter: Arbitrator interatction

Injection Behavior Interrupt Guard

Subjects and Their Internal Behavior

In this section, each subject from the subject interaction diagram is individually presented.

Guard Arbitrator: End Behavior Request in SID Guards 2

Figure 45: **Guard Arbitrator: End Behavior Request**

Extends relation:

This subject takes part in hierarchical subject extension tree (it extends another subject).

All attributes listed here only belong to the extending subject. **Other attributes can be found on the extended subject's page. (Behavior Execution Arbitrator)**

In the following tree, the current subject is marked with a star (*):

---------- **Behavior Execution Arbitrator**

|--------- **Guard: Arbitrator - External Priority Adjustment**

|--------- **Guard Arbitrator Injections Handling**

|--------- **Guard Arbitrator: create-new ad-hoc extension layer**

|--------- Guard Arbitrator: End Behavior Request <-- (*)

Subject behavior:

This subject is connected with a Subject Behavior Diagram. The SBD is displayed on a following page.

Sending States:

inform Envoironment

Complete Subject Behavior Diagram GBD_17_SID_1_GuardExtension_3

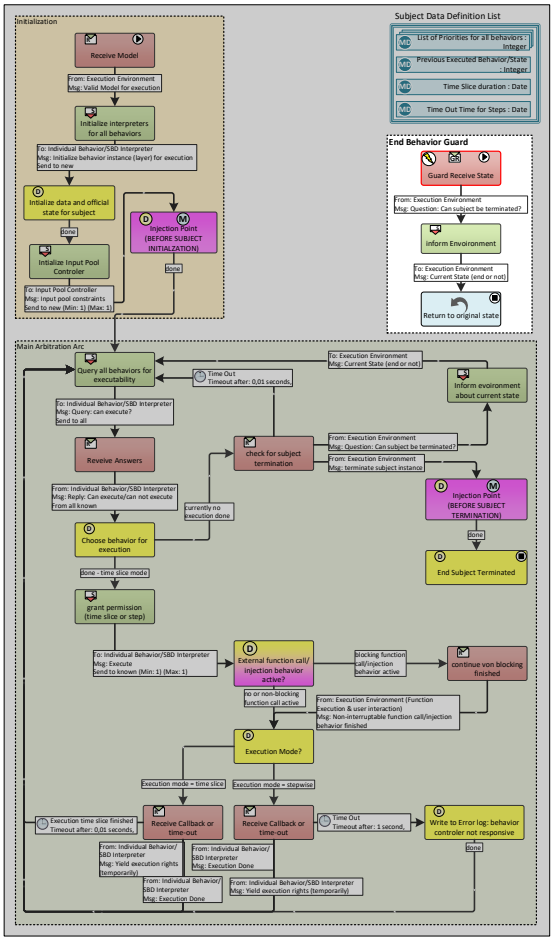

Figure 46: Subject Behavior for Guard Arbitrator: End Behavior Request

Guard Calendar: Timer Transition Registration Guard in SID Guards 2

Figure 47: **Guard Calendar: Timer Transition Registration Guard**

Extends relation:

This subject takes part in hierarchical subject extension tree (it extends another subject).

All attributes listed here only belong to the extending subject. **Other attributes can be found on the extended subject's page. (Calendar/Timer)**

In the following tree, the current subject is marked with a star (*):

---------- **Calendar/Timer**

|--------- Guard Calendar: Timer Transition Registration Guard <-- (*)

Subject behavior:

This subject is connected with a Subject Behavior Diagram. The SBD is displayed on a following page.

Complete Subject Behavior Diagram GBD_18_SID_1_GuardExtension_8

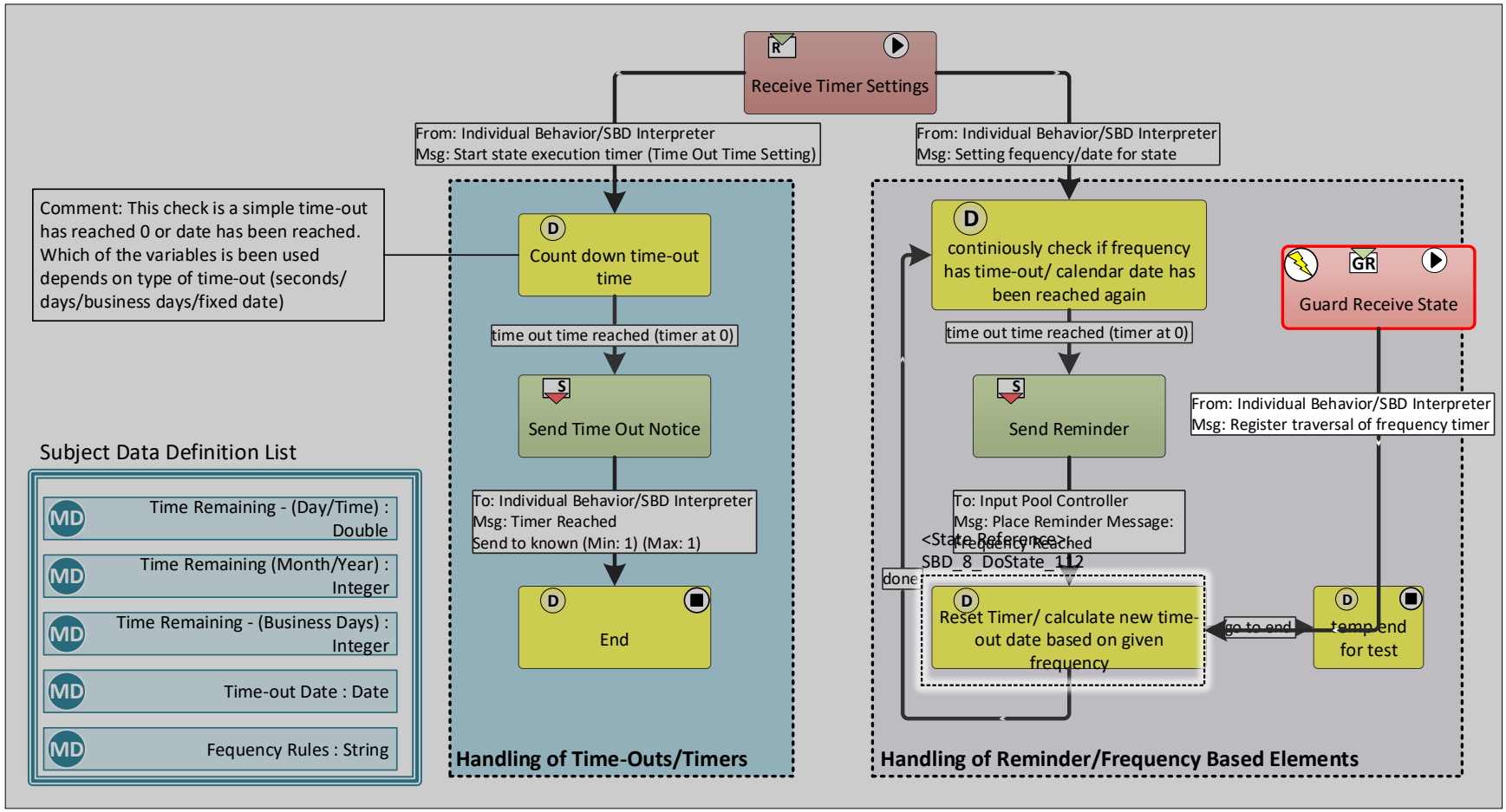

Figure 48: Subject Behavior for [Guard Calendar: Timer Transition Registration Guard]

Guard Interpreter: Arbitrator interatction in SID Guards 2

Figure 49: **Guard Interpreter: Arbitrator interatction**

Extends relation:

This subject takes part in hierarchical subject extension tree (it extends another subject).

All attributes listed here only belong to the extending subject. **Other attributes can be found on the extended subject's page. (Individual Behavior/SBD Interpreter)**

In the following tree, the current subject is marked with a star (*):

---------- **Individual Behavior/SBD Interpreter**

|--------- **Guard Interpreter: Direct Excutability**

|--------- **Guard Injections Handling**

|--------- **Guard Timer Transition Handling**

|--------- **Guard Interpreter: User Cancel**

|--------- **Macro Check Executability**

|--------- Guard Interpreter: Arbitrator interatction <-- (*)

Subject behavior:

This subject is connected with a Subject Behavior Diagram. The SBD is displayed on a following page.

Functions States:

Determin Excecutability

Receiving States:

Await alotment or remain idle here

Sending States:

reply status

Interrupt all interruptable function calls

Comment: Is being ignored if there is no active function call / function call has been requested without interrupts

Resume interrupted function calls

Complete Subject Behavior Diagram GBD_20_SID_1_GuardExtension_12

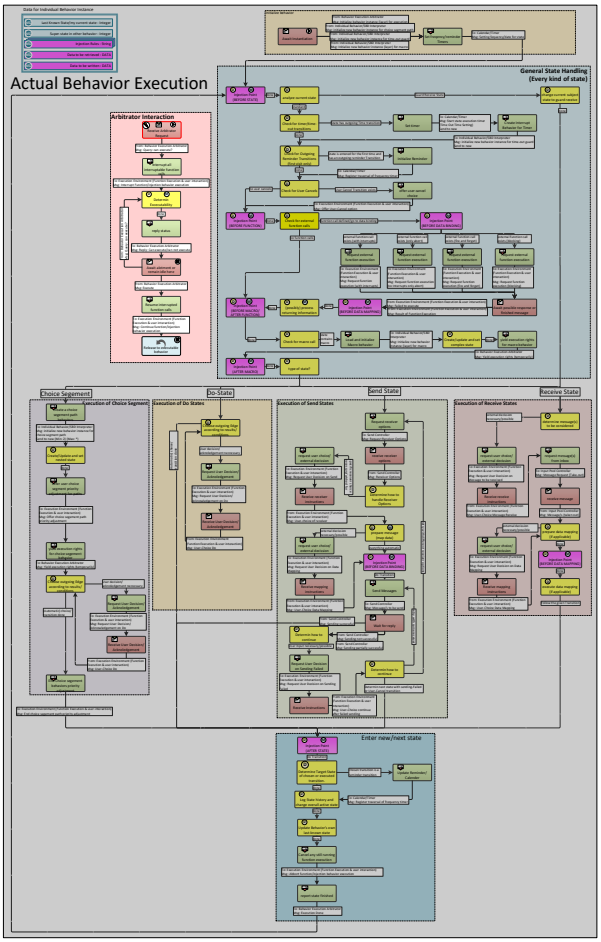

Figure 50: Subject Behavior for Guard Interpreter: Arbitrator interatction

Injection Behavior Interrupt Guard in SID Guards 2

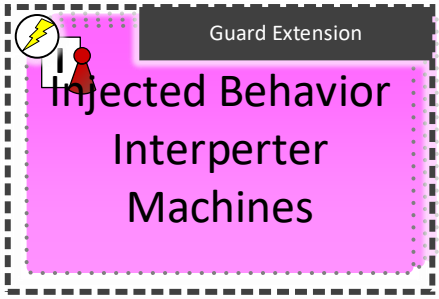

Figure 51: **Injection Behavior Interrupt Guard**

Extends relation:

This subject takes part in hierarchical subject extension tree (it extends another subject).

All attributes listed here only belong to the extending subject. **Other attributes can be found on the extended subject's page. (Injected Behavior Interperter Machines)**

In the following tree, the current subject is marked with a star (*):

---------- Injected Behavior Interperter Machines

|--------- Injection Behavior Interrupt Guard <-- (*)

Subject behavior:

This subject is connected with a Subject Behavior Diagram. The SBD is displayed on a following page.

Functions States:

End

Receiving States:

Await

Sending States:

Report IB finished

Complete Subject Behavior Diagram GBD_58_SID_1_GuardExtension_17

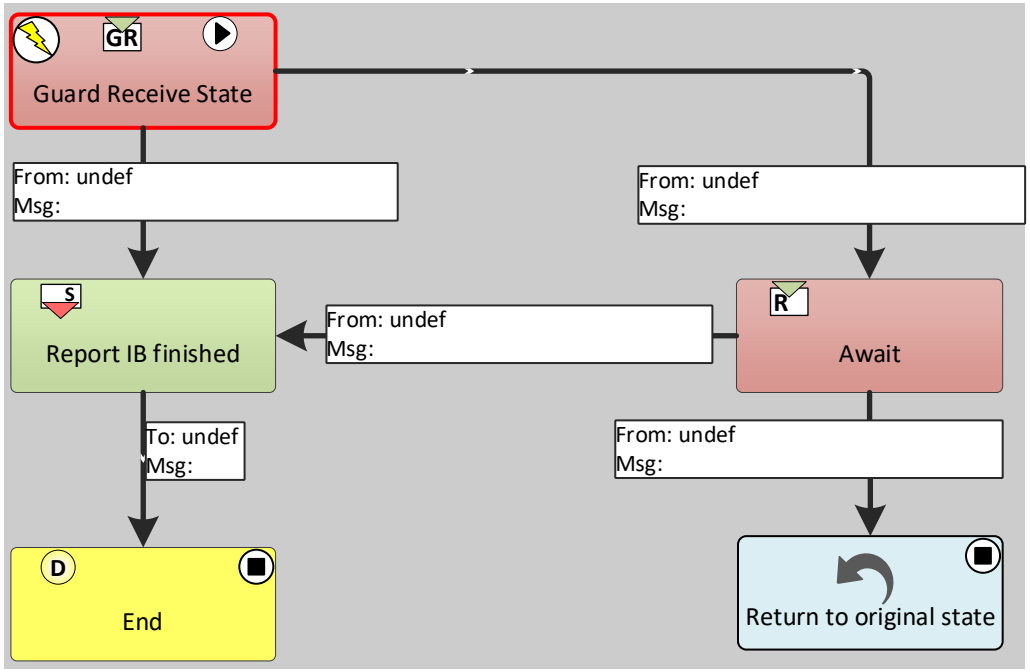

Figure 52: Subject Behavior for Injection Behavior Interrupt Guard