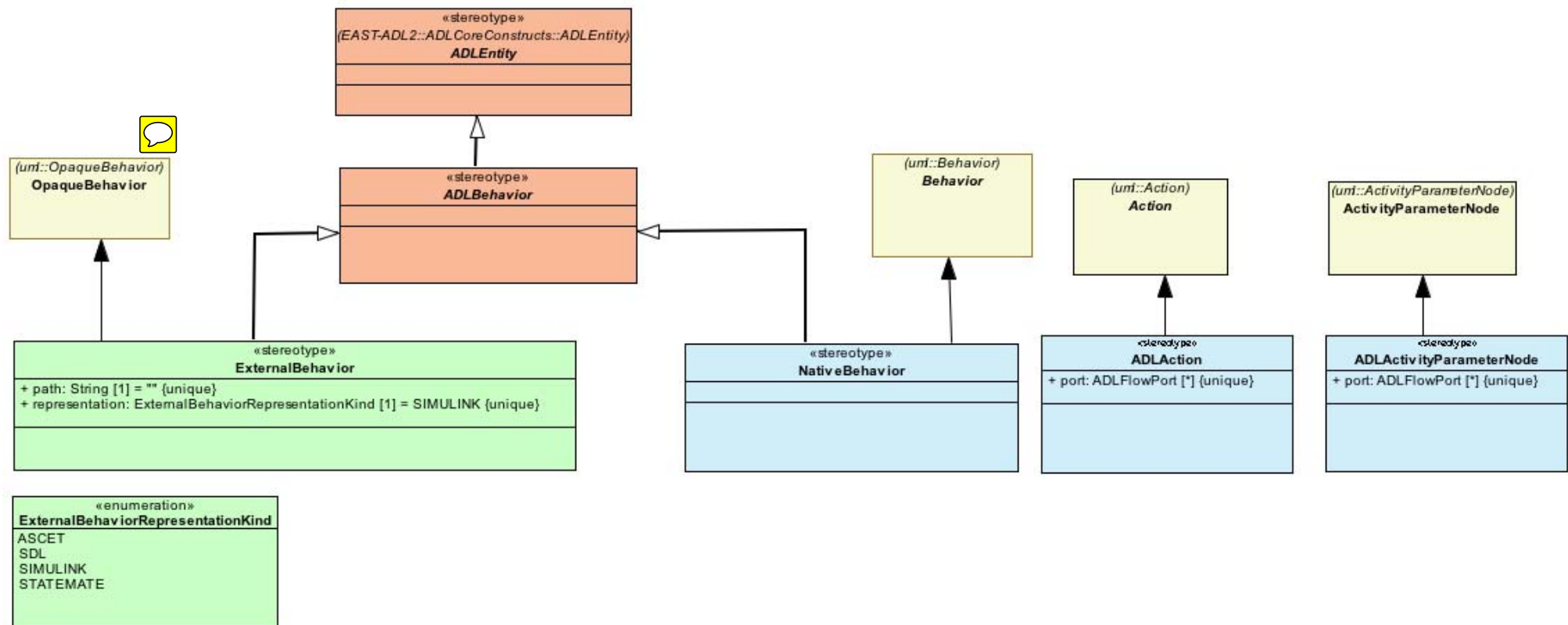# EAST-ADL2 Execution Semantics

Leaf functions of an EAST-ADL2 function hierarchy is called Elementary ADLFunction

Elementary ADLFunctions have synchronous execution semantics:

1. Read inputs

2. Execute (duration: Execution time)

3. Write outputs

Execution is defined by a behavior that acts as a transfer function.
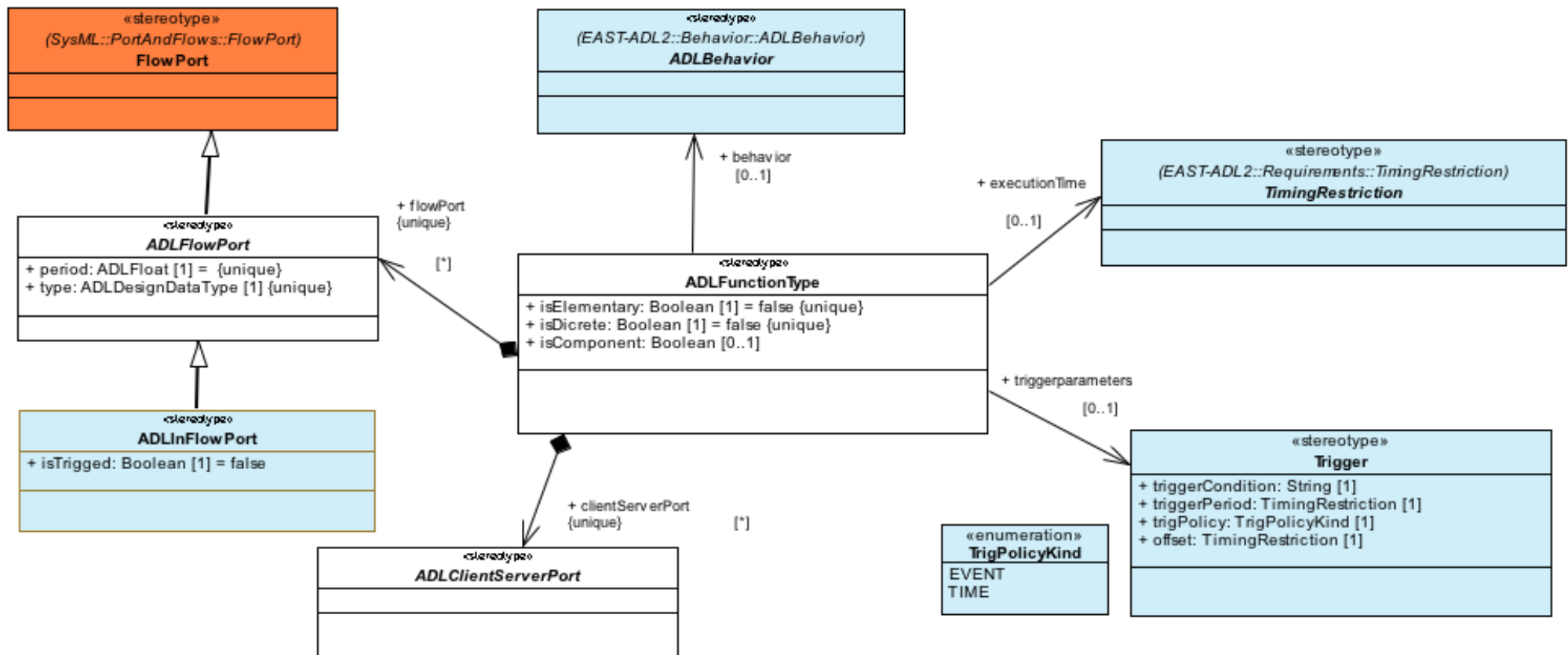
Behavior constructs 1/2

Distinction between external (ref. to file) and native, def. of modeling shortcuts
UML2 classes that are extended in the UML2 profile implementation are yellow

Modeling shortcuts

Several levels should be allowed to cope with users with various needs/skills w.r.t. to UML, namely to cope with data access on ports

- "*NativeBehavior*" and "*ExternalBehavior*" granted implicit access

- "*ADLFlowPort*" referencing list of operations directly without use of *Interfaces*

- "*ADLAction*" to reference ports on actions

- "*ADLActivityParameterNode*" to refrence ports as parameters of acitivties

- "*ADLPin*" to reference ports on input/output pins of actions

- a set of actions, e.g. *ReadDataFromPortAction*, regrouped in a *ModelLibrary*, part of the profile, for the real-experienced user and for sake of precision semantics - help show what is intended by our modeling shortcuts (MARTE approach btw), also extended with SignalProcessing (e.g. Simulink?) basic actions

Behavior constructs 2/2

Link with ADLFunctionType: behavior, triggers, and trigged flow ports

Trigger modes

Trigger: {periodic, event}   Defines the triggering policy. If this is set to 'time', then TriggerPeriod must be set. If this is set to 'event', then ADLInflowPorts tagged isTrigged = true. In *both* cases, TriggerCondition has to be defined.

TriggerPeriod: TimingRestriction   The trigger period of the ElementarySoftwareFunction, if periodic triggering is used.

TriggerCondition: String   A Boolean expression that must evaluate to true for this ElementarySoftwareFunction to execute. This value is used both for periodically and for event triggered Elementary-Software-Functions.

Offset: TimingRestriction   The offset in ms from the period start time. Applies to periodic triggering policy only (The ElementarySoftwareFunction becomes eligleble for execution Offset time units after the period start time)

ExecutionTime: TimingRestriction   The execution time from the start (activation) to completion for the ElementarySoftwareFunction.
ExecutionTime is therefore a tentative value that may be subject to back-annotation

EAST-ADL2 Perspectives

✓The overall behavior and environmental model constructs were established in EAST-ADL2

✓Investigation led to find out possible mismatches in semantics w.r.t. to UML, can be dealt with:

 ✓ more careful definition of the semantics attached to the stereotypes

 ✓ building blocks (library of specific actions) for the definition of native behaviors inside activity diagrams (work started for environmental modeling and Simulink import/export)

✓Definite need to lead some work in close loop with simulation tools (as was done for ErrorBehavior