

Documentation for repository **EmbeddedMontiArc**

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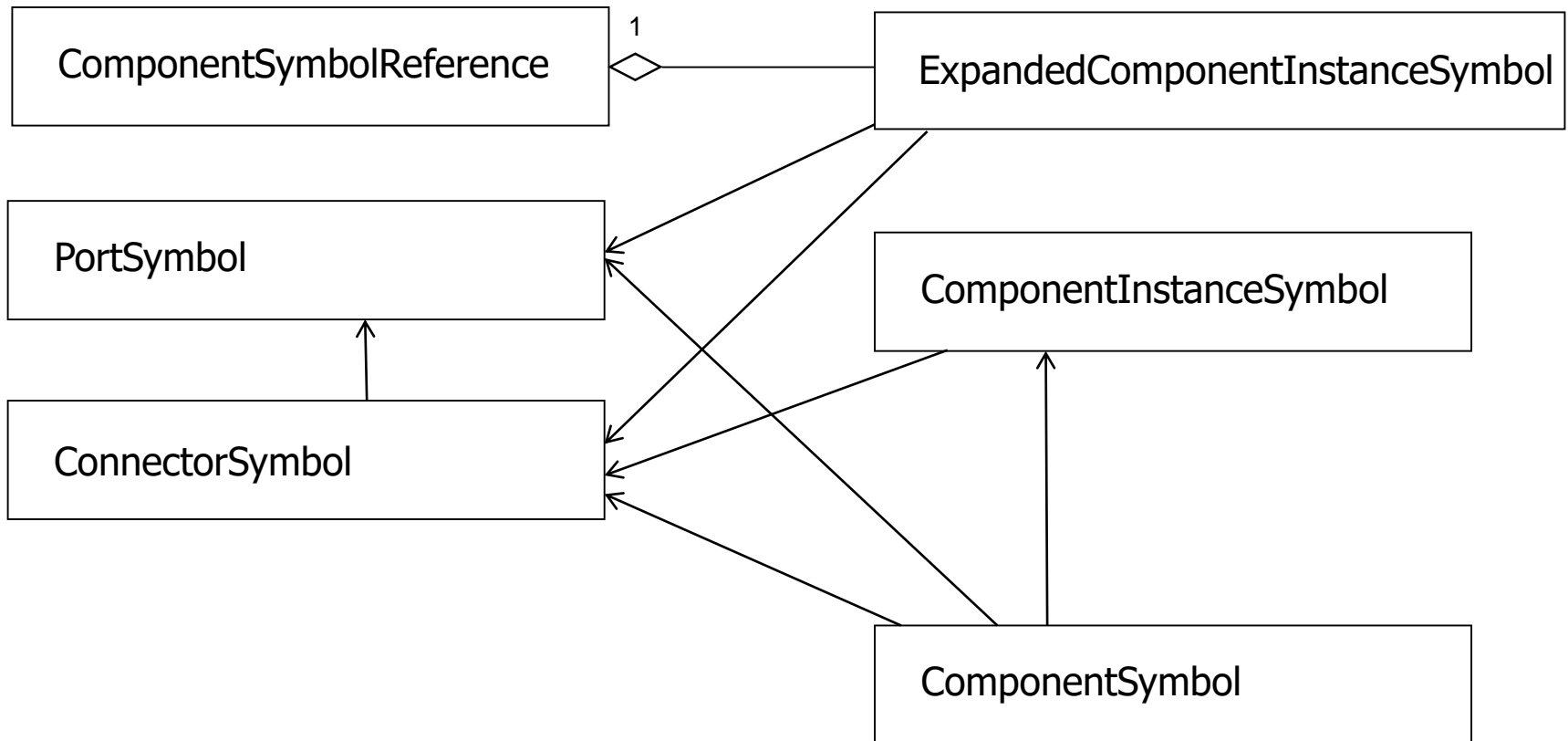
Purpose

- Textual structured diagram language to describe the architecture of a component and connector system
- Based on the MontiArc language with additional features:
 - Value ranges(e.g. $Z(4:20)$)
 - SIUnits(e.g. $Z(4m:20m)$)
 - Port Arrays (e.g. port in N1 value[5])
 - ComponentInstance Arrays(e.g. instance Component comp[4])
- Provides all information needed for writing a code generator

Most Important Classes

- Namely:
 - ComponentSymbol
 - ConnectorSymbol
 - PortSymbol
 - ExpandedComponentInstanceSymbol
 - ComponentInstanceSymbol
 - ComponentSymbolReference

Class Relations



ComponentSymbol

- A component consists of ports, connectors and subcomponents(component instances)
- They also support Generics like (A<N1 amount>)
- Can be used to set the amount of component or port array elements like (port in inPort[amount])
- ComponentSymbols themselves may contain SymbolReferences which need to be resolved
- Test Coverage: 65%

ComponentInstanceSymbol

- Contains all information needed for subcomponent instantiation:
 - Generic information like:
 - Concrete type
 - Concrete array size
 - All ports, connectors and sub component instances of this component instance
- Test Coverage: 64%

ConnectorSymbol

- Stores information about ports that are connected
- A source port is connected to a target port
- Test Coverage: 71%

PortSymbol

- Stores information about:
 - Type
 - Name
- Test Coverage: 51%

ExpandedComponentInstanceSymbol

- ExpandedComponentInstanceSymbol are ComponentSymbols that resolve all SymbolReferences automatically
- ExpandedComponentInstanceSymbols are constructed using the builder pattern(ExpandedComponentInstanceBuilder)
- This symbol should be used in most cases(is also used by the EmbeddedMontiArcMath2CPP(EMAM2CPP) generator)
- Test Coverage: 54%

Software Quality

- Code Quality(according to codeclimate.com): C
- Test Coverage:
 - Whole: 21%
 - Handwritten code: 58%
 - Generated code: 13%

Additional Information

- There also exists the EmbeddedMontiArcMath language which allows adding a behavior description to EmbeddedMontiArc models using the MontiMath language
- This feature is realized by using the language embedding feature of MontiCore

Utilization(Excerpt)

- Used in the following projects:
 - EmbeddedMontiArcMath
 - EMAM2CPP
 - ClusterFiddle
 - Autopilot model for MontiSim

Future Work

- Refactoring and cleanup
- Project contains several deprecated methods which will be removed in the future
- Improve CoCos
- Improve/Add error messages to make modeling easier for the user and suggest solutions for common errors
- Integrate utilizing projects as tests to improve test coverage and robustness