AADL Components

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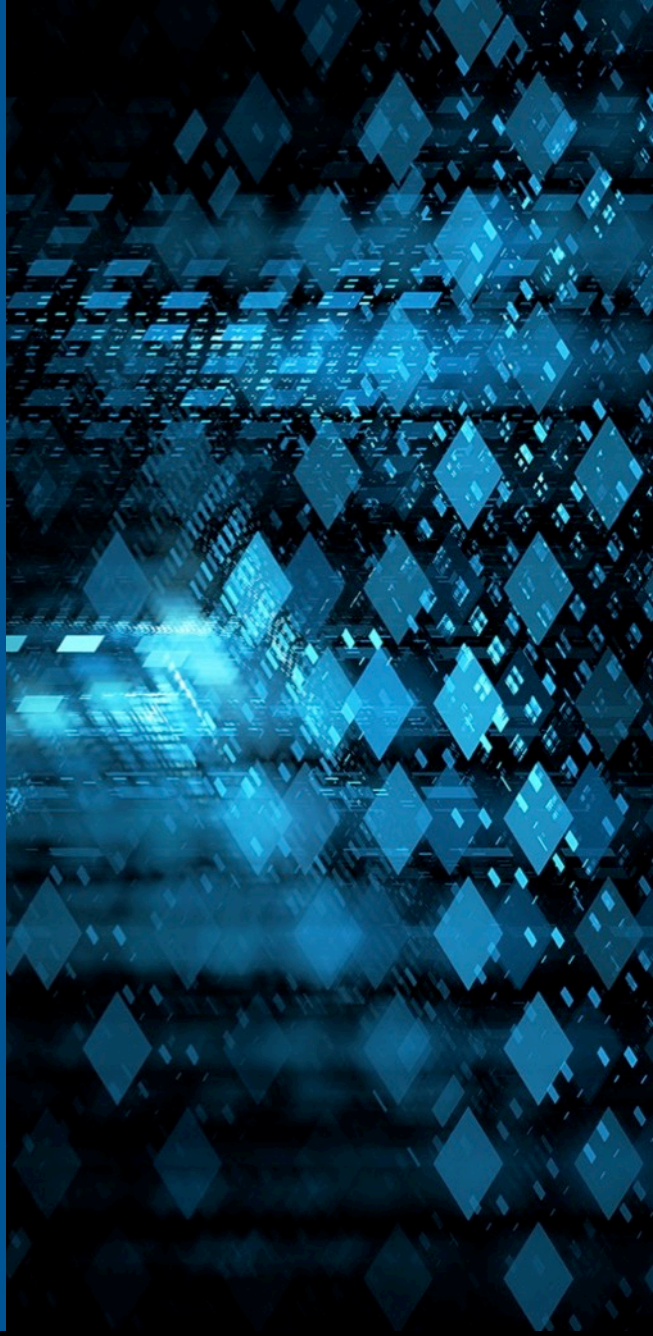

This material is based upon work funded and supported by the Department of Defense under Contract No. FA8702-15-D-0002 with Carnegie Mellon University for the operation of the Software Engineering Institute, a federally funded research and development center.

DM18-0659

From Interface Composition

Component interface (aka type) and implementation

- For component type use **interface** keyword (stay with category only) when declaring types
- Optional component category

```
interface sub
features
    name : in feature person ;
    surname : in feature person ;
end ;
process interface subsub
features
    p1 : port date ;
    p2 : port date ;
end ;
```

- For component implementation use **implements** keyword
  - *System sub_impl implements packA::sub*

```
system sub_impl implements sub
subcomponents
    s1 : process subsub ;
    s2 : thread subsub { #Period => 20; };
end ;
```

- Allow multiple interfaces in **extends**
- **Implementation name is still type.impl as it provide syntactic feedback in subcomponents as to whether we have selected type or impl/config**
- **(PHF: some contexts allow implementation names & classifier.feature (subprogram)**

From Configurations

Allow reach-down configuration assignment (**refined to**)

- Substitution restricted to extensions in configurations
- No reach down into parameterized configurations
- Proposal to use => instead of **refined to** even in implementations
  - Substitution rule in configuration limited to configuration extensions
  - Category gets refined from abstract to a concrete one
- Bracketing {} vs. “end”, “section” keywords

Reach down property association without **applies to**

- **Sub1#period => 20 ms;**

Configuration parameter replaces prototype

- Prototype requires reference of prototype throughout implementation
  - One level only requires repetition of prototype down the hierarchy
- Configuration parameter is mapped via reach down
  - Allows for parameterization of existing model without modification

Extends multiple to support composition of configurations

- Composition rules for configurations maintain/expand depth topology
  - Implementation extension substitution rule
    - Allow interface extension as well?
  - No additional components/connections are introduced
  - Flows, annexes, property values can be added

AADL Components Revised

Optional section keywords

- Currently: *features, properties, subcomponents, connections*
- Make optional or add into configuration
  - No ordering requirement for declarations (ok)
  - Classifier bracketing by {} or *begin / end* or *end only*

```
device interface sensor {
    senseddata: out port;
    #Period => 20;
}

system gps {
    location: out data port;
    locator : process LocatorProcess ;
}
```

AADL Components Revised

Implementation without separate interface declaration #12

- Allow features in implementation
  - For components with only one implementation
  - Extensions can add features

```
system gps
features
    location: out data port;
subcomponents
    locator : process LocatorProcess ;
end ;
```

  - No: We still have typename.implname thus need to refer to type.

AADL Components Revised

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```
system ControlSystem
subcomponents
    sensing : device {
       system ControlSystem {
            sensing: device { sensedata: out port;};
    } ;
    proc    processing: {
                filter: thread {
                    inp: in port;
                    outp: out port;
                };
                control: thread {
                    inp: in port;
                    outp: out port;
                };
                filtercontrolconn: filter.outp -> control.inp;
            };
    } ;     actuating: device { inp: in port; };
    actu    sensefilterconn: sensing.sensedata -> processing.filter.inp;
            controlactuateconn: processing.control.outp -> actuating.inp;
    } ;}
connections
    sensefilterconn : sensing.sensedata -> processing.filter.inp ;
    controlactuateconn : processing.control.outp -> actuating.inp ;
end ;
```

AADL Components Revised

Component category

- **Abstract** => **component**

- Eliminate **thread group** by allowing **component** or no category (no)

- Allow threads without being contained in **process**
  - Currently not allowed in **system** but in **abstract**

- Difference between **component** and **system**?

- For functional architectures
  - Use keyword **function**?

Nested packages

Packages declared inside packages

- Grouping of packages
- Composite name path
- Scope of visibility of nested packages
- Import of package collection

Optional subcomponent Category Keywords #13

Subcomponent declaration without category

- Infer category from classifier
- Explicit category improves readability and allows for consistency check with classifier
- Explicit category allows association of category with generic classifier (interface or abstract/component)
- Category ensure additional semantics
- No (generic) category allows for component modeling without additional semantics (how about period property?)

Composition of Implementations

We have composition of interfaces

We have composition of configurations