AADL V3 Property Language

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Property Language

(Property) types (unified type system)

- Distinguish between types to be used in model specification (BA, constraint, property values) and types used as application data types
- No more **aadlinteger**, …
- Record: map can represent record
  - Require all fields?
  - Require naming of fields in assignment or assume ordering?
- Lists (sequence), sets, bag (multiset), map for properties
  - Explicit types: on value assignment same syntax for lists/sets of values
  - Map use case: key based value
- Union of types:
  - for application types
  - For properties?:
    - e.g., compute entry point
    - Value: invalid or actual value
- Intersection of types?
- Integration of proposed Units system (ISO, SysML)

Property Language

Property set

- Place property definitions in packages
- Name path (dot) for property sets

- Alias for properties: consider
  - We have relabeled source code size to code size
  - FASTAR defined properties independently and then wanted to align
  - Subset definition: with and without different name

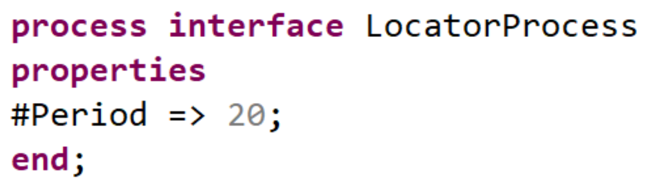
Property Definition

Identify scope of application (**applies to**)

- No need to list enclosing categories for **inherit**
  - Known from standard
  - Need for inherit (use pattern notation?) see other slide
- Component categories, etc
  - Meta model elements
- No user defined classifiers
  - This creates dependency of property types on user defined packages
  - handled via stereotype
- No default value as part of definition
  - Scoped defaults via inherited property values
  - All properties can be inherited
  - Leave it in place: but no reference to another property, but allow reference to constant
  - Default value for record fields: assign whole record
- Lists, sets: append

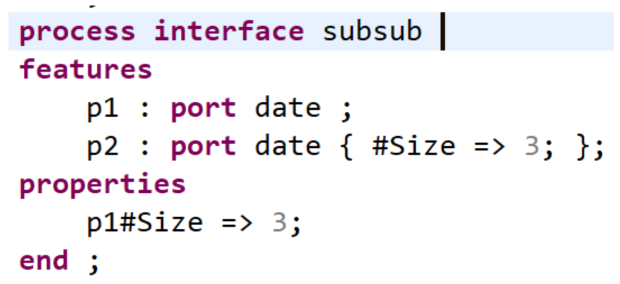
Property Association

- Property reference always with #



```
process interface LocatorProcess
properties
#Period => 20;
end;
```

- Properties on classifier elements
  - Directly attached
  - Via model element reference (aka contained property association)
  - P1 => { #prop1 => 2; #prop2 => 3;}



```
process interface subsub
features
    p1 : port date ;
    p2 : port date { #Size => 3; };
properties
    p1#Size => 3;
end ;
```

Property Association in Annexes

Syntax in context of an annex

- ^Process1.thread2@Failstop#Occurrence => 2.3e-5;
  - ^ escape to core model as context
  - @ enter same annex type as original
  - @(BA) enter specified annex: if we have annex specific properties in the annex rather than core we may not need this

Syntax in context of EMV2 annex

- ^Process1.thread2@Failure{Overheated}#Occurrence => 2.3e-5;
  - {} syntax for types in EMV2

Mode specific property value assignment #8

- Currently with **in modes** specification
  - Mode may be for an enclosing component
    - Include mode identifier as part of path (m1, m2)
    - Similar to array element as part of path [idx1]

Property Values

Scoped default value

- Inherit of property value from enclosing component
  - All properties potentially inherit
  - Inherit vs. wildcards in property associations #11
    - Proc.*#Period => 20 ms; vs. #Period on proc inherited by contained threads
  - Pattern notation for assignment (see configuration)

Value in terms of another property: Needed? no

- Use example: Deadline => Period;

Final property value

- Explicit: **constant** tagging in assignment
- Implicit: via configuration

Need for classifier or model element references?

Compute values

Property Applicability

Specification of which properties apply to a component

- "Stereo" type, "property set"
- Stereo type identifies a set of property definitions
  - May or may not include a (default) property va
  - Gets associated with component classifier

Do we want to use the keyword **stereotype**?

Use configuration mechanism to attach threadprops stereotype to all thread classifiers.?best way?

```
ThreadProperties : properties {
  Dispatch_Protocol, Period, Deadline, Execution_time
};
```

```
Dispatch_Protocol: union (Periodic, Aperiodic, );
Periodic : record {
Period, Deadline, Execution_time
};
```

```
Periodic : properties {
  Dispatch_Protocol => constant Periodic,
  Period, Deadline, Execution_time
};
```

Records will lead us to specify values multiple times. The stereo allows property in several stereo but as a single property.

```
device GPS
use properties Periodic;
End GPS;
```

A set of properties with values: property value configuration

Property Applicability

Specification of which properties apply to a component

- Component can have multiple associated stereo types
  - Property definition reference in multiple stereo types is acceptable (without conflicting values)

```
Periodic : properties {
  Dispatch_Protocol => constant Periodic,
  Period, Deadline, Execution_time
};
```

```
GPSProperties :  properties {
  Period, GPSPropertyset::Sensitivity,
GPSPropertyset::Hardening
};
```

Do we need collections of collections?

```
device GPS
 use properties GPSPropertyset::Sensitivity,
Periodic;
End GPS;
```

```
device GPS
 use properties
GPSProperties;
End GPS;
```

Property Applicability

Use in precondition specification for analyses

- Component categories/classifiers that are expected to have a value for a given set of properties