AADL provides binding properties to describe how application software components are allocated to the execution platform.

Binding properties

- **Actual_Processor_Binding** – Specify which processor schedules and executes a thread or executes a (kernel mode) device driver
- **Actual_Memory_Binding** – Specify the memory components in which executable code (process components) and data (data component) reside
- **Actual_Connection_Binding** – Specify the communication channels that are used by logical connections

Bindings must be specified using contained property associations in a component implementation that contains both the bound component and the component it is bound to.
Processor Binding

- Threads and devices that require driver software must be bound to a processor for execution.
- A thread can be bound to two or more processors at the same time
  - Use this pattern if there is a pool of processors that can each execute a thread, and the scheduler provides load balancing, e.g., in a multi-core CPU
  - Each single execution happens only on one of these processors
  - Subsequent executions may happen on another processor
  - The scheduler is responsible for selecting the processor
Memory Binding

- Processes or data are bound to memory.
- A process or data can be bound to more than one memory component
  - If the data size is larger than the size of a single memory component.
  - If part of the data is bound to ROM and another part is bound to RAM.
Processor and Memory Bindings

```
system implementation hw_sys.i
  subcomponents
    pentium: processor ...
    RAM: memory ...
    pci: bus ...
end hw_sys.i;

system implementation sys.impl
  subcomponents
    sw: system sw_sys.i;
    hw: system hw_sys.i;
  properties
    Actual_Processor_Binding => (reference(hw.pentium)) applies to sw.p.t;
    Actual_Memory_Binding => (reference(hw.RAM)) applies to sw.p;
end sys.impl;

system implementation sw_sys.i
  subcomponents
    p: process p.i;
end sw_sys.i;
process implementation p.i
  subcomponents
    t: thread;
end p.i;
```

Lookup hw.pentium

Lookup sw.p.t
Connection Binding

Communication that crosses the boundary of execution platform components must flow over a bus component that provides the physical connectivity.

Example: Two connected threads are bound to different processors. Each processor is connected via a PCI bus to a radio, and the two radios can communicate with each other.

In the overall system implementation `sys.impl`:

```
Actual_Connection_Binding => (  
    reference(hw.pci1), reference(hw.radio1), reference(hw.wlan),  
    reference(hw.radio2), reference(hw.pci2)  
) applies to sw.conn;
```
Scheduling Analysis

- cc_process Process has a MIPS budget of 1200 MIPS.

- Perform scheduling analysis to see if the single core CPU can accommodate the scheduling of the process.