

Using a Quantity Manager for modeling a Network

Demos for quantity managers can be found in `ptolemy/actor/lib/qm/demo`. The actors can be found in the library under `MoreLibrairies->QuantityManager`: Bus, TTESwitch, BasicSwitch, CrossbarSwitch.

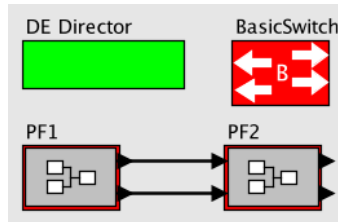
Let us suppose that two Digital Controllers communicate using a switch: Controller PF1 sends two data, qS and wS, to Controller PF2 through the network ¹.

Steps to build a model using a Quantity Manager using a Switch:

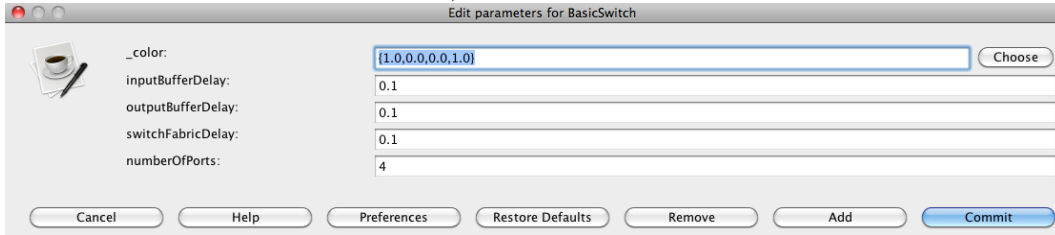
1. create a model using a DE director with composite actor PF1 and PF2; you need to put a DE director inside each actor (see Figure 1.a);
2. make the logical connections between the output ports of PF1 (qS, wS) and the respective input ports of PF2;
3. put a BasicSwitch in the top level model: this actor is found in the `MoreLibrairies->QuantityManager`;
4. double click in the BasicSwitch icon. The default values are 0.1 for the delays (inputBufferDelay, outputBufferDelay and switchBufferDelay) and the number of ports is 4 (see Figure 1.b). The values were changed for 2 ports and delays of 0.05;
5. according to your topology, create as many parameters as the quantity of ports of the switch, indicating to which actor it is connected. In this example (Figure 1.c), the parameters 0 through $k-1$ (k is the number of ports) have been created with a value corresponding to the name of the actor it is connected to. In this example, they are, respectively, PF1 and PF2 (double click in the BasicSwitch actor, click Add, name it and put its value). An error message appears if the actor does not exist.
6. declare (by adding a parameter) at each input port of the actor receiving the networked data (input ports of PF2) all quantity managers that are traversed (from the sender port to the received port): right click on the input port, `Customize->Configure`, Add a parameter (see Figure 1.d and e) put the name of the actor (BasicSwitch in Figure 1.a). can be the same name for all input ports Notice that the color of the input port in Figure 1.f has changed (it has the same color of the declared BasicSwitch). The order in which quantity managers are specified is also the order in which they process the tokens from the sender.
7. suggestion: put the used topology using `Utilities->Decorative->Annotation` as in Figure 1.e.

Source for this document may be found in `ptpapers/11/QuantityManager`

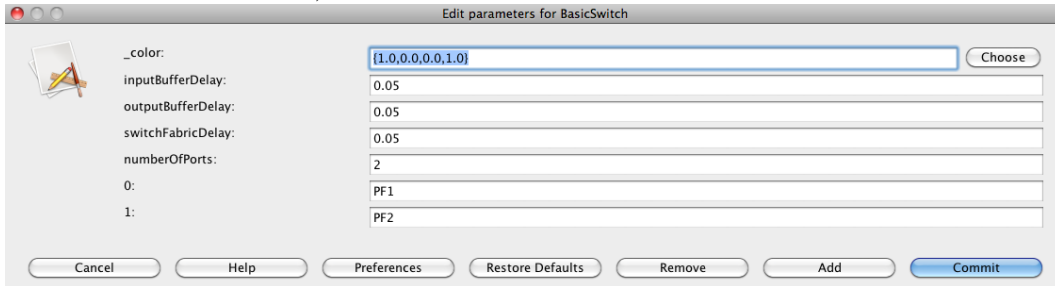
¹For a more complex topology, see the demo `/ptII/ptolemy/actor/lib/qm/demo/Switch/BasicSwitch.xml`.



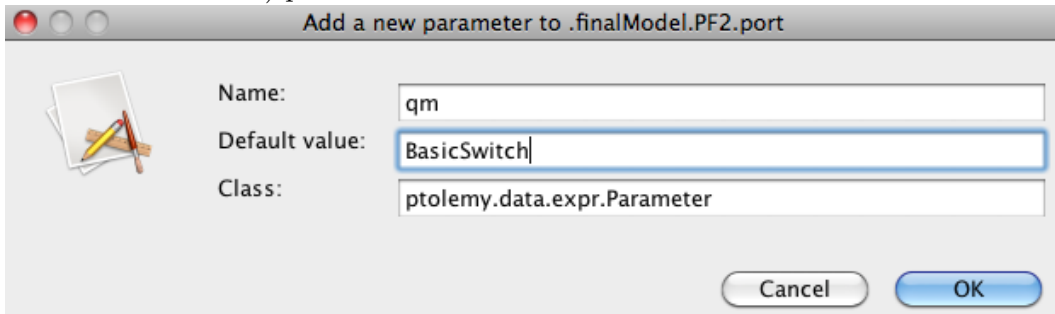
a) initial model



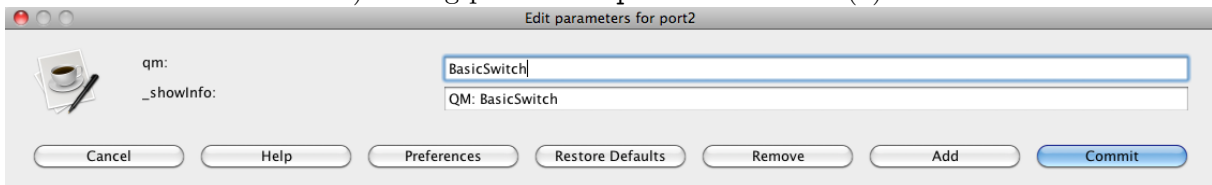
b) default parameters of BasicSwitch



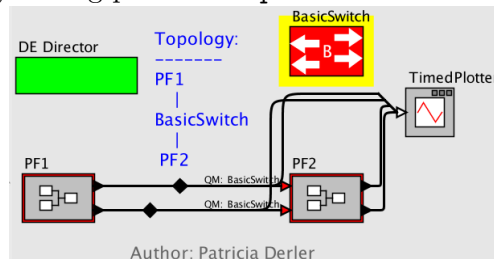
c) parameters 0 and 1 added to BasicSwitch



d) adding parameter qm to BasicSwitch (1)



e) adding parameter qm to BasicSwitch (2)



f) final model

Figure 1: Quantity Manager