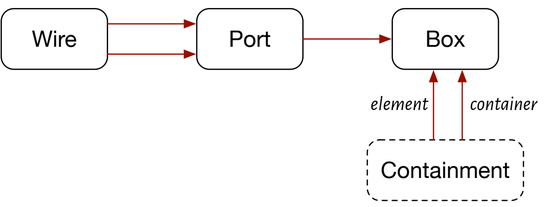
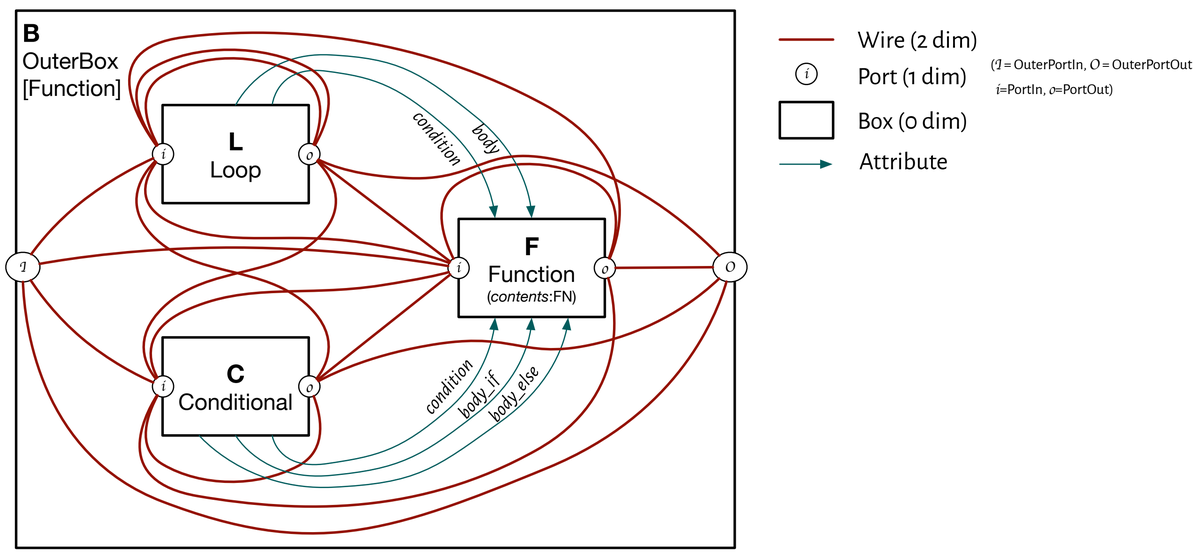
GroMEt Base Schema $\mathcal{G}$



GroMEt FunctionNetwork $\mathcal{FN}$

Instance of Base $\mathcal{FN} \in Set^{\mathcal{G}}$

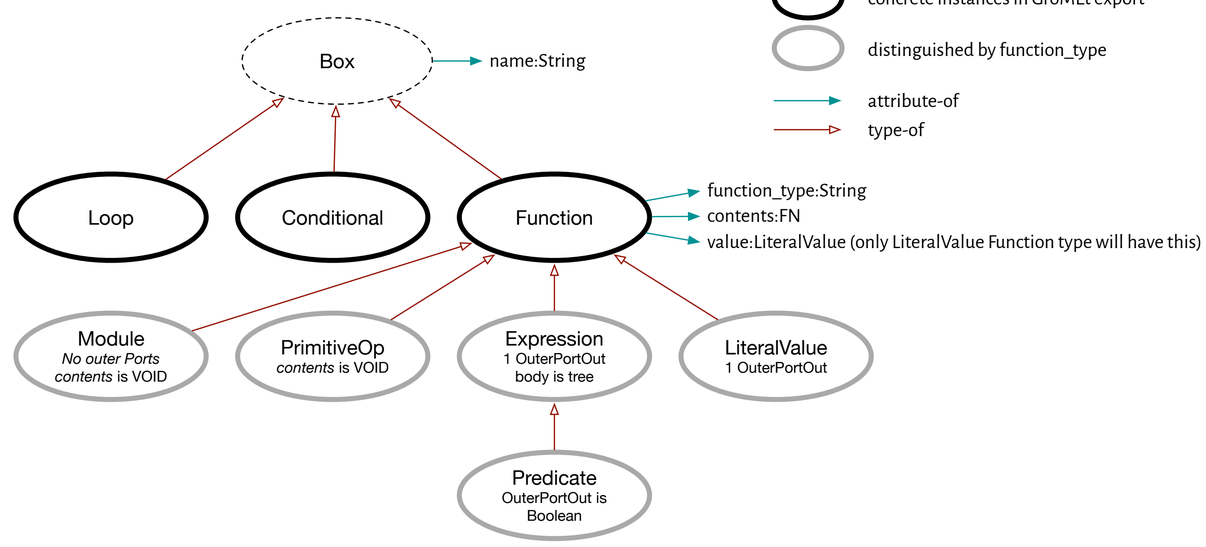
(Instance of Base Schema as a category-theoretic Wiring Diagram)



Box Types

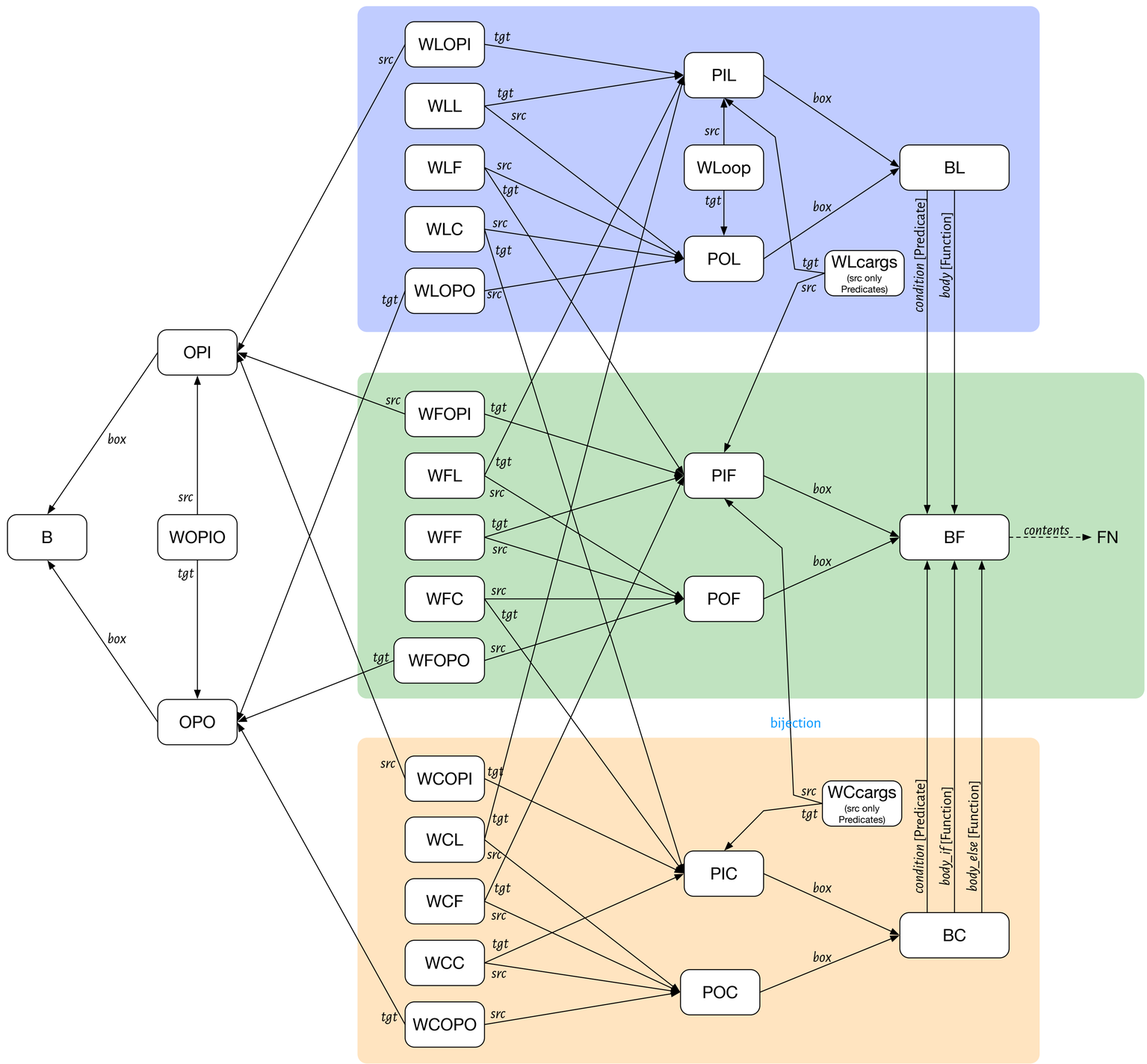
As a FN, the lower instances of the Box Type Hierarchy impose some structural constraints.

Functions have their own hierarchy that will not be explicitly represented in the GroMEt export, but instead represented by a *function_type* (String) attribute associated with the Function Box.
The most general form is Function, which includes no constraints.
When a box has FN contents, the Box type will be the type of the contents FN.
These structural constraints are not enforced by the schema but would need to be validated
These Box types will also have different attributes.
Module is special and only appears that the "top" level FN.



$\int_{\mathcal{G}} \mathcal{FN}$ Derived schema for $Set^{\mathcal{G}}/\mathcal{FN}$

(Can be directly interpreted as an ER (Entity-Relation) database schema)



Notes:

Naming Conventions: All type names start with their schema syntactic type:
- OP = OuterPort
  - OPI = OuterPortIn, OPO = OuterPortOut
- P = Port
  - the next Port name letters:
    - I = in, O = out ; followed by L = Loop, F = Function, C = Conditional
- W = Wire
  - For 3-lettered Wire names, the last two letters are:
    - src -> tgt, with L = Loop, F = Function, C = Conditional
- B = Box
  - followed by L = Loop, F = Function, C = Conditional

Special Wire cases:
(1) **WOIO**: Wire from OuterPortIn to OuterPortOut (i.e., passthrough)
(2) **WLcargs** and **WCcargs** represent a map (as Wires) from the arguments of the condition (**cargs**) Predicate (src) of the **L**oop or **C**onditional to the PortIn's (tgt) of the Loop or Conditional Box.
(3) **WLoop** represents the map (as Wires) from the Loop's Port Inputs (PIL) to the Loop's Port Outputs (POL).

The background color patches group Ports, Wires and Boxes that are present depending on whether Function (green), Loop (blue) or Conditional (orange) is present.

BL and BC Boxes *contain* Box (with FN contents) that are Predicates (for conditions) or else Functions (or any subtype except Module). The PIF and POF of the contained BF match the PIL/POL (or PIC/POC) of the outer Loop (or Conditional), with the exception of the conditional Predicates, who's PIF args are mapped to the enclosing Loop/Conditional PIL/PIC by the WLcargs/WCcargs (respectively). The contained BF may then have FN *contents*.