typing rules:

$$\frac{C_{in}, A : prov;\ C_{out}, A : prov \vdash \text{declare-connections } B, cons \text{ in } p}{C_{in};\ C_{out} \vdash \text{declare-connections } A, B, cons \text{ in } p}$$

$$\frac{C_{in}, A : prov;\ C_{out}, A : prov \vdash p}{C_{in};\ C_{out} \vdash \text{declare-conn } A \text{ in } p}$$

$inputs(opt_a) = \{0, \ldots, n\}$ $outputs(opt_a) = \{0', \ldots, m\}$

$$\frac{C_{in}, op_a[0] : opt_a[0], \ldots, op_a[n] : opt_a[n];\ C_{out}, op_a[0] : opt_a[0'], \ldots\ m : m' \vdash \text{d-o ops in } p}{C_{in};\ C_{out} \vdash \text{declare-ops } op_a : opt_a, ops \text{ in } p}$$

$\vdash$ declare-ops $op_a : opt_a$ in p as above but recur to $\vdash p$

$$\frac{C_{in};\ C_{out} \vdash p_1 \qquad C_{in}';\ C_{out}' \vdash p_2}{C_{in}, C_{in}';\ C_{out}, C_{out}' \vdash p_1 \mid p_2}$$

$$\frac{C_{in};\ \varnothing \vdash in \qquad C_{out};\ \varnothing \vdash out}{C_{in};\ C_{out} \vdash in;\ out}$$

$$\frac{C;\ path \vdash p \qquad C';\ path;\ p \vdash p'}{C, C';\ path \vdash p;\ p'}$$

$$A : p;\ p \vdash A$$

$$\frac{C;\ p \vdash p'}{C, A : p;\ \varnothing \vdash A;\ p'}$$

remains: tee, rejoin, operators.