Typing

$$\text{T-Task}\ \frac{x : C\ ;\ ocap \vdash t : \sigma \qquad \Gamma\ ;\ a \vdash b : \quad Q \triangleright Box[C]}{\Gamma\ ;\ a \vdash \quad task\ (b)\ \{ x \Rightarrow t \} : \quad q \triangleright Task[C]}$$

$$\text{T-Async}\ \frac{Perm[\ Q\ ] \in \Gamma \qquad \Gamma \setminus \ Perm[Q]\ ;\ a \vdash s \qquad \Gamma ; a \vdash t : \quad Q \triangleright Task[C]}{\Gamma\ ;\ a \ \vdash\ async\ (t)\ \{\ s \quad \} : \underline{\perp}}$$

$$\text{T-Finish}\ \frac{\Gamma\ ;\ a \vdash \ t : \tau}{\Gamma\ ;\ a \vdash\ finish\ \{\ t\ \} : null}$$

Evaluation

$$\text{Switch}\ \frac{}{H, FS, TS \uplus \{GS\} \Rightarrow H, GS, TS \uplus \{FS\}}$$

$$\text{Task}\ \frac{L(b') = b(o,p)}{H, \langle L, \text{let } x = \text{task}(b')\{x = s\ t\} \text{ in } s, P\rangle^{\ell}, TS \rightarrow H, \langle L[x \rightarrow \text{task}(b(o,p), t)], s, P\rangle^{\ell}, TS}$$

$$\text{Async}\ \frac{FS' = \langle \text{FINISH } f\rangle \circ FS'' \vee FS' = \langle \text{ASYNC } f\rangle \quad \nexists G \in FS.\ G = \langle \text{FINISH } f'\rangle \quad L(y) = \text{task}(b(o,p), t) \quad T = \langle [x \rightarrow o], t, \emptyset\rangle^{\varepsilon} \circ \langle \text{ASYNC } f\rangle \quad p \in P}{H, \langle L, \text{async}(y)\{s\}, P\rangle^{\ell} \circ FS \circ FS', TS \rightarrow H, \langle L, s, P \setminus \{p\}\rangle^{\varepsilon} \circ FS', TS \cup \{T\}}$$

$$\text{Finish}\ \frac{F_1 = \langle L, t, P\rangle^{\varepsilon} \quad F_2 = \langle \text{FINISH } f\rangle \quad f \text{ fresh} \quad F_3 = \langle L[x \rightarrow \text{Null}], s, P\rangle^{\ell}}{H, \langle L, \text{let } x = \text{finish}\{t\} \text{ in } s, P\rangle^{\ell} \circ FS, TS \rightarrow H, F_1 \circ F_2 \circ F_3 \circ FS, TS}$$

$$\text{Frame-Finish}\ \frac{\nexists T \in TS.\ T = FS' \circ \langle \text{ASYNC } f\rangle}{H, \langle \text{FINISH } f\rangle \circ FS, TS \rightarrow H, FS, TS}$$

$$\text{Frame-Async}\ \frac{}{H, \langle \text{ASYNC } f\rangle, TS \uplus \{FS\} \Rightarrow H, FS, TS}$$