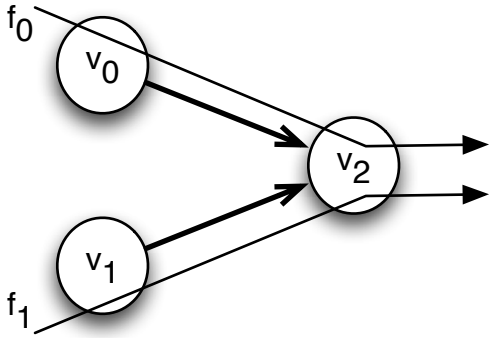
Tree_1SC_2Flows_1AC_2Paths



- $\beta_{v_0} = \beta_{v_1} = \beta_{v_2} = \beta_{R_{v_i},T_{v_i}} = \beta_{20,20}$, $i \in \{0,1,2\}$
- $\alpha^{f_0} = \alpha^{f_1} = \alpha^{f_2} = \gamma_{r^{f_j},b^{f_j}} = \gamma_{5,25}$, $j \in \{0,1,2\}$

<table>
<tr><td>computeOutputBound$(v_i, f_i) = (\alpha_{v_i}^{f_i})^*$, $i \in \{0,1\}$</td><td colspan="2">FIFO_MUX</td><td colspan="2">ARB_MUX</td></tr>
<tr><td colspan="2">$\alpha_{v_i}^{xf_i}$</td><td colspan="3">$= \gamma_{0,0}$</td></tr>
<tr><td rowspan="3">$\beta_{v_i}^{\text{l.o.}f_i} = [\beta_{v_i} - \alpha_{v_i}^{xf_i}]^+ = \beta_{R_{v_i}^{\text{l.o.}f_i},T_{v_i}^{\text{l.o.}f_i}}$</td><td>$R_{v_i}^{\text{l.o.}f_i}$</td><td colspan="3">$[R_{v_i} - r_{v_i}^{xf_i}]^+ = 20$</td></tr>
<tr><td>$T_{v_i}^{\text{l.o.}f_i}$</td><td>$\beta_{v_i} = b_{v_i}^{xf_i}$
$20 \cdot [t-20]^+ = 0$
$t = 20$</td><td>$\beta_{v_i} = \alpha_{v_i}^{xf_i}$
$20 \cdot [t-20]^+ = 0 \cdot t + 0$
$t = 20$</td></tr>
<tr><td>$=$</td><td colspan="2">$= \beta_{20,20}$</td></tr>
<tr><td rowspan="3">$(\alpha_{v_i}^{f_i})^* = \alpha^{f_i} \oslash \beta_{v_i}^{\text{l.o.}f_i} = \gamma_{(r_{v_i}^{f_i})^*,(b_{v_i}^{f_i})^*}$</td><td>$(r_{v_i}^{f_i})^*$</td><td colspan="3">$= 5$</td></tr>
<tr><td>$(b_{v_i}^{f_i})^*$</td><td colspan="3">$\alpha^{f_i}(T_{v_i}^{\text{l.o.}f_i}) = 5 \cdot 20 + 25 = 125$</td></tr>
<tr><td>$=$</td><td colspan="3">$= \gamma_{5,125}$</td></tr>
</table>

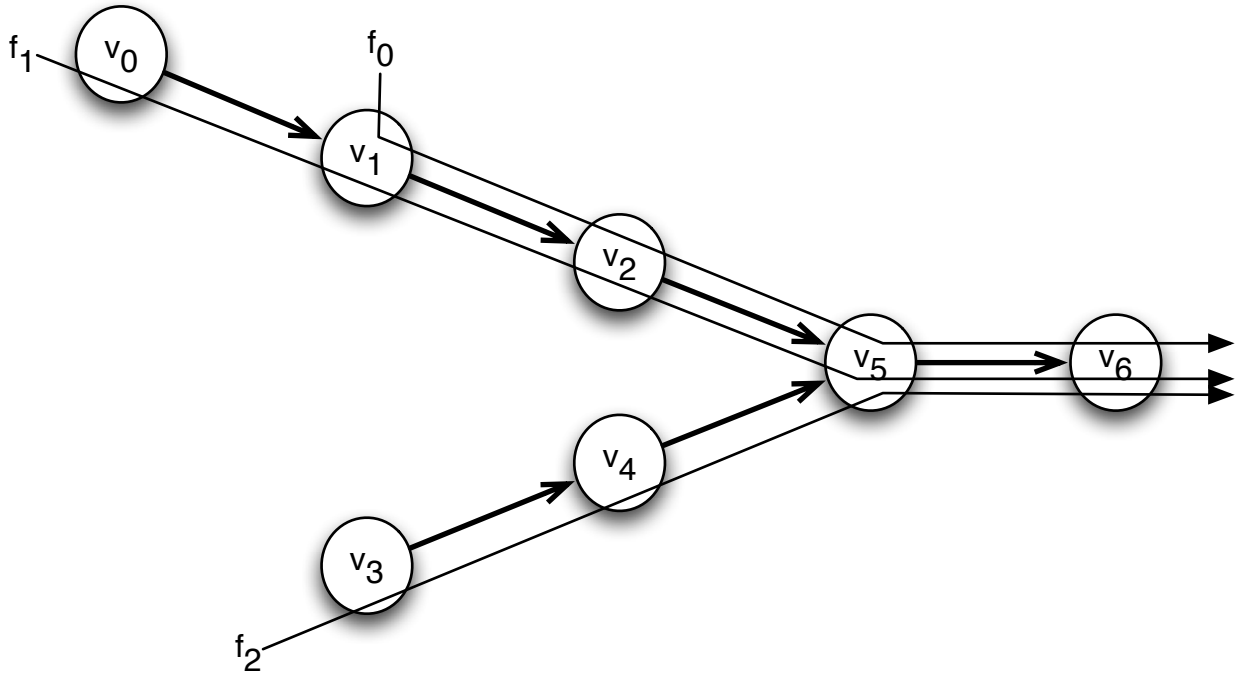
Flow f_i, $i \in \{0,1\}$ (comparable with Tandem_1SC_2Flows_1AC_2Paths)

TFA		FIFO_MUX	ARB_MUX
v_i	$\alpha_{v_i} = \alpha^{f_i}$	$= \gamma_{5,25}$	
	$D_{v_i}^{f_i}$	$\beta_{v_i} = b_{v_i}$ $20 \cdot [t-20]^+ = 25$ $t = 21\frac{1}{4}$	FIFO per micro flow $\beta_{v_i} = b_{v_i}$ $20 \cdot [t-20]^+ = 25$ $t = 21\frac{1}{4}$
	$B_{v_i}^{f_i}$	$\alpha_{v_i}(T_{v_i}) = 5 \cdot 20 + 25$ $= 125$	
v_2	$\alpha_{v_2} = \sum_i (\alpha_{v_i}^{f_i})^*$	$= \gamma_{5,125} + \gamma_{5,125} = \gamma_{10,250}$	
	$D_{v_2}^{f_i}$	$\beta_{v_2} = b_{v_1}$ $20 \cdot [t-20]^+ = 250$ $t = 32\frac{1}{2}$	$\beta_{v_2} = \alpha_{v_2}$ $20 \cdot [t-20]^+ = 10 \cdot t + 250$ $t = 65$
	$B_{v_2}^{f_i}$	$\alpha_{v_2}(T_{v_2}) = 10 \cdot 20 + 250$ $= 450$	
D^{f_i}		$\sum_{j=\{i,2\}} D_{v_j}^{f_i} = 53\frac{3}{4}$	$\sum_{j=\{i,2\}} D_{v_j}^{f_i} = 86\frac{1}{4}$
B^{f_i}		$\max_{j=\{i,2\}} b_{v_j}^{f_i} = 450$	

PMOO and SFA yield the same result because there is no tandem of servers to be convoluted before substracting common crossflows.

SFA, PMOO			FIFO_MUX (SFA only)	ARB_MUX
v_i	$\alpha_{v_i}^{xf_i}$		$= \gamma_{0,0}$	
	$\beta_{v_i}^{\text{l.o.}f_i} = [\beta_{v_i} - \alpha_{v_i}^{xf_i}]^+ = \beta_{v_i}$		$= \beta_{20,20}$	
	$\alpha_{v_i v_2}^{xf_i} = \gamma_{r_{v_i v_2}^{xf_i}, b_{v_i v_2}^{xf_i}}$		$= \gamma_{0,0}$	
v_2	$\alpha_{v_2}^{xf_0} = (\alpha_{v_i}^{f_i})^*$		$= \gamma_{5,125}$	
	$\beta_{v_2}^{\text{l.o.}f_i} = [\beta_{v_2} - \alpha_{v_2}^{xf_i}]^+ = \beta_{R_{v_2}^{\text{l.o.}f_i}, T_{v_2}^{\text{l.o.}f_i}}$	$R_{v_2}^{\text{l.o.}f_i}$	$[R_{v_2} - r_{v_2}^{xf_i}]^+ = 15$	
		$T_{v_2}^{\text{l.o.}f_i}$	$\beta_{v_2} = b_{v_2}^{xf_i}$ $20 \cdot [t-20]^+ = 125$ $t = 26\frac{1}{4}$	$\beta_{v_2} = \alpha_{v_2}^{xf_i}$ $20 \cdot [t-20]^+ = 5 \cdot t + 125$ $t = 35$
		$=$	$= \beta_{15,26\frac{1}{4}}$	$= \beta_{15,35}$
$\beta_{\text{e2e}}^{\text{l.o.}f_i} = \beta_{R_{\text{e2e}}^{\text{l.o.}f_i}, T_{\text{e2e}}^{\text{l.o.}f_i}}$			$\bigotimes_{j=\{i,2\}} \beta_{v_j}^{\text{l.o.}f_i} = \beta_{15,46\frac{1}{4}}$	$\bigotimes_{j=\{i,2\}} \beta_{v_j}^{\text{l.o.}f_i} = \beta_{15,55}$
D^{f_i}			$\beta_{\text{e2e}}^{\text{l.o.}f_i} = b^{f_i}$ $15 \cdot [t - 46\frac{1}{4}]^+ = 25$ $t = 47\frac{11}{12}$	$\beta_{\text{e2e}}^{\text{l.o.}f_i} = b^{f_i}$ $15 \cdot [t-55]^+ = 25$ $t = 56\frac{2}{3}$
B^{f_i}			$\alpha^{f_i}(T_{\text{e2e}}^{\text{l.o.}f_i}) = 5 \cdot 46\frac{1}{4} + 25$ $= 256\frac{1}{4}$	$\alpha^{f_i}(T_{\text{e2e}}^{\text{l.o.}f_i}) = 5 \cdot 55 + 25$ $= 300$

Tree_1SC_3Flows_1AC_3Paths



- $\beta_{v_0} = \beta_{v_1} = \beta_{v_2} = \beta_{R_{v_i},T_{v_i}} = \beta_{20,20}$, $i \in \{0,1,2\}$
- $\alpha^{f_0} = \alpha^{f_1} = \alpha^{f_2} = \gamma_{r^{f_j},b^{f_j}} = \gamma_{5,25}$, $j \in \{0,1,2\}$

$\text{computeOutputBound}(v_0, f_1) = (\alpha_{v_0}^{f_1})^* = \alpha_{v_0 v_1}^{f_1}$		FIFO_MUX	ARB_MUX
$\alpha_{v_0}^{xf_1}$		$= \gamma_{0,0}$	
$\beta_{v_0}^{\text{l.o.}f_1} = [\beta_{v_0} - \alpha_{v_0}^{xf_1}]^+ = \beta_{v_0}$		$= \beta_{20,20}$	
$\alpha_{v_0 v_1}^{f_1} = \alpha^{f_1} \oslash \beta_{v_0}^{\text{l.o.}f_1} = \alpha^{f_1} \oslash \beta_{v_0}$	$r_{v_0 v_1}^{f_1}$	$= 5$	
	$b_{v_0 v_1}^{f_1}$	$\alpha^{f_1}(T_{v_0}^{\text{l.o.}f_1}) = 125$	
	$=$	$= \gamma_{5,125}$	

$\text{computeOutputBound}(v_1, f_1) = (\alpha_{v_1}^{f_1})^* = \alpha_{v_1 v_2}^{f_1}$		FIFO_MUX	ARB_MUX
$\alpha_{v_1}^{xf_1} = \alpha^{f_0}$		$= \gamma_{5,25}$	
$\beta_{v_1}^{\text{l.o.}f_1} = [\beta_{v_1} - \alpha_{v_1}^{xf_1}]^+$	$R_{v_1}^{\text{l.o.}f_1}$	$= 15$	
	$T_{v_1}^{\text{l.o.}f_1}$	$\beta_{v_1} = b_{v_1}^{xf_1}$ $20 \cdot [t-20]^+ = 25$ $t = 21\frac{1}{4}$	$\beta_{v_1} = \alpha_{v_1}^{xf_1}$ $20 \cdot [t-20]^+ = 5 \cdot t + 25$ $t = 28\frac{1}{3}$
	$=$	$= \beta_{15,21\frac{1}{4}}$	$= \beta_{15,28\frac{1}{3}}$
$\alpha_{v_1 v_2}^{f_1} = \alpha_{v_1}^{f_1} \oslash \beta_{v_1}^{\text{l.o.}f_1} = \alpha_{v_0 v_1}^{f_1} \oslash \beta_{v_1}^{\text{l.o.}f_1}$	$r_{v_1 v_2}^{f_1}$	$= 5$	
	$b_{v_1 v_2}^{f_1}$	$\alpha_{v_0 v_1}^{f_1}(T_{v_1}^{\text{l.o.}f_1}) = 231\frac{1}{4}$	$\alpha_{v_0 v_1}^{f_1}(T_{v_1}^{\text{l.o.}f_1}) = 266\frac{2}{3}$
	$=$	$= \gamma_{5,231\frac{1}{4}}$	$= \gamma_{5,266\frac{2}{3}}$

$\text{computeOutputBound}(v_1, f_0) = (\alpha_{v_1}^{f_0})^* = \alpha_{v_1 v_2}^{f_0}$		FIFO_MUX	ARB_MUX
$\alpha_{v_1}^{xf_0} = \alpha_{v_0 v_1}^{f_1}$		$= \gamma_{5,125}$	
$\beta_{v_1}^{\text{l.o.}f_0} = [\beta_{v_1} - \alpha_{v_1}^{xf_0}]^+$	$R_{v_1}^{\text{l.o.}f_0}$	$= 15$	
	$T_{v_1}^{\text{l.o.}f_0}$	$\beta_{v_1} = b_{v_1}^{xf_0}$ $20 \cdot [t-20]^+ = 125$ $t = 26\frac{1}{4}$	$\beta_{v_1} = \alpha_{v_1}^{xf_0}$ $20 \cdot [t-20]^+ = 5 \cdot t + 125$ $t = 35$
	$=$	$= \beta_{15,26\frac{1}{4}}$	$= \beta_{15,35}$
$\alpha_{v_1 v_2}^{f_0} = \alpha_{v_1}^{f_0} \oslash \beta_{v_1}^{\text{l.o.}f_0} = \alpha_{v_0 v_1}^{f_0} \oslash \beta_{v_1}^{\text{l.o.}f_0}$	$r_{v_1 v_2}^{f_0}$	$= 5$	
	$b_{v_1 v_2}^{f_0}$	$\alpha_{v_0 v_1}^{f_0}(T_{v_1}^{\text{l.o.}f_0}) = 156\frac{1}{4}$	$\alpha_{v_0 v_1}^{f_0}(T_{v_1}^{\text{l.o.}f_0}) = 200$
	$=$	$= \gamma_{5,156\frac{1}{4}}$	$= \gamma_{5,200}$

$\text{computeOutputBound}(v_2, f_1) = (\alpha_{v_2}^{f_1})^* = \alpha_{v_2 v_5}^{f_1}$		FIFO_MUX	ARB_MUX
$\alpha_{v_2}^{xf_1} = \alpha_{v_1 v_2}^{f_0}$		$= \gamma_{5,156\frac{1}{4}}$	$= \gamma_{5,200}$
$\beta_{v_2}^{\text{l.o.}f_1} = [\beta_{v_2} - \alpha_{v_2}^{xf_1}]^+$	$R_{v_2}^{\text{l.o.}f_1}$	$= 15$	
	$T_{v_2}^{\text{l.o.}f_1}$	$\beta_{v_2} = b_{v_2}^{xf_1}$ $20 \cdot [t-20]^+ = 156\frac{1}{4}$ $t = 27\frac{13}{16}$	$\beta_{v_2} = \alpha_{v_2}^{xf_1}$ $20 \cdot [t-20]^+ = 5 \cdot t + 200$ $t = 40$
	$=$	$= \beta_{15,27\frac{13}{16}}$	$= \beta_{15,40}$
$\alpha_{v_2 v_5}^{f_1} = \alpha_{v_2}^{f_1} \oslash \beta_{v_2}^{\text{l.o.}f_1} = \alpha_{v_1 v_2}^{f_1} \oslash \beta_{v_1}^{\text{l.o.}f_1}$	$r_{v_2 v_3}^{f_1}$	$= 5$	
	$b_{v_2 v_3}^{f_1}$	$\alpha_{v_1 v_2}^{f_1}(T_{v_2}^{\text{l.o.}f_1}) = 370\frac{5}{16}$	$\alpha_{v_1 v_2}^{f_1}(T_{v_2}^{\text{l.o.}f_1}) = 466\frac{2}{3}$
	$=$	$= \gamma_{5,370\frac{5}{16}}$	$= \gamma_{5,466\frac{2}{3}}$

$\text{computeOutputBound}(v_2, f_0) = (\alpha_{v_2}^{f_0})^* = \alpha_{v_2 v_5}^{f_0}$		FIFO_MUX	ARB_MUX
$\alpha_{v_2}^{xf_0} = \alpha_{v_1 v_2}^{f_1}$		$= \gamma_{5,231\frac{1}{4}}$	$= \gamma_{5,266\frac{2}{3}}$
$\beta_{v_2}^{\text{l.o.}f_0} = [\beta_{v_2} - \alpha_{v_2}^{xf_0}]^+$	$R_{v_2}^{\text{l.o.}f_0}$	$= 15$	
	$T_{v_2}^{\text{l.o.}f_0}$	$\beta_{v_2} = b_{v_2}^{xf_0}$ $20 \cdot [t-20]^+ = 231\frac{1}{4}$ $t = 31\frac{9}{16}$	$\beta_{v_2} = \alpha_{v_2}^{xf_0}$ $20 \cdot [t-20]^+ = 5 \cdot t + 266\frac{2}{3}$ $t = 44\frac{4}{9}$
	$=$	$=\beta_{15,31\frac{9}{16}}$	$=\beta_{15,44\frac{4}{9}}$
$\alpha_{v_2 v_5}^{f_0} = \alpha_{v_2}^{f_0} \oslash \beta_{v_2}^{\text{l.o.}f_0} = \alpha_{v_1 v_2}^{f_0} \oslash \beta_{v_1}^{\text{l.o.}f_0}$	$r_{v_2 v_3}^{f_0}$	$= 5$	
	$b_{v_2 v_3}^{f_0}$	$\alpha_{v_1 v_2}^{f_0}(T_{v_2}^{\text{l.o.}f_0}) = 370\frac{5}{16}$	$\alpha_{v_1 v_2}^{f_0}(T_{v_2}^{\text{l.o.}f_0}) = 488\frac{8}{9}$
	$=$	$= \gamma_{5,389\frac{5}{16}}$	$= \gamma_{5,488\frac{8}{9}}$
$\text{computeOutputBound}(v_3, f_2) = (\alpha_{v_3}^{f_2})^* = \alpha_{v_3 v_4}^{f_2}$		FIFO_MUX	ARB_MUX
$= \text{computeOutputBound}(v_0, f_1) = (\alpha_{v_0}^{f_1})^* = \alpha_{v_0 v_1}^{f_1}$		$= \gamma_{5,125}$	
$\text{computeOutputBound}(v_4, f_2) = (\alpha_{v_4}^{f_2})^* = \alpha_{v_4 v_5}^{f_2}$		FIFO_MUX	ARB_MUX
$\alpha_{v_4}^{xf_2}$		$= \gamma_{0,0}$	
$\beta_{v_4}^{\text{l.o.}f_2} = [\beta_{v_4} - \alpha_{v_4}^{xf_2}]^+$		$=\beta_{20,20}$	
$\alpha_{v_4 v_5}^{f_2} = \alpha_{v_4}^{f_2} \oslash \beta_{v_4}^{\text{l.o.}f_2} = \alpha_{v_3 v_4}^{f_2} \oslash \beta_{v_4}^{\text{l.o.}f_2}$	$r_{v_4 v_5}^{f_2}$	$= 5$	
	$b_{v_4 v_5}^{f_2}$	$\alpha_{v_3 v_4}^{f_2}(T_{v_4}^{\text{l.o.}f_2}) = 225$	
	$=$	$= \gamma_{5,225}$	

Flow f_0

TFA		FIFO_MUX	ARB_MUX
v_1	$\alpha_{v_1} = \alpha^{f_0} + \alpha^{f_1}_{v_0 v_1}$	$= \gamma_{5,25} + \gamma_{5,125} = \gamma_{10,150}$	
	$D^{f_0}_{v_1}$	$\beta_{v_1} = b_{v_1}$ $20 \cdot [t-20]^+ = 150$ $t = 27\frac{1}{2}$	$\beta_{v_1} = \alpha_{v_1}$ $20 \cdot [t-20]^+ = 10 \cdot t + 150$ $t = 55$
	$B^{f_0}_{v_1}$	$\alpha_{v_1}(T_{v_1}) = 10 \cdot 20 + 150$ $= 350$	
$v_1 v_2$	$\alpha_{v_1 v_2} = (\alpha_{v_1})^*$	$= \gamma_{10,350}$	
v_2	$\alpha_{v_2} = \alpha_{v_1 v_2}$	$= \gamma_{10,350}$	
	$D^{f_0}_{v_2}$	$\beta_{v_2} = b_{v_2}$ $20 \cdot [t-20]^+ = 350$ $t = 37\frac{1}{2}$	$\beta_{v_2} = \alpha_{v_2}$ $20 \cdot [t-20]^+ = 10 \cdot t + 350$ $t = 75$
	$B^{f_0}_{v_2}$	$\alpha_{v_2}(T_{v_2}) = 10 \cdot 20 + 350$ $= 550$	
$v_2 v_5$	$\alpha_{v_2 v_5} = (\alpha_{v_2})^*$	$= \gamma_{10,550}$	
$v_4 v_5$	$\alpha_{v_4 v_5} = \alpha^{f_2}_{v_4 v_5}$	$= \gamma_{5,225}$	

TFA		FIFO_MUX	ARB_MUX
v_5	$\alpha_{v_5} = \alpha_{v_4 v_5} + \alpha_{v_2 v_5}$	$= \gamma_{5,225} + \gamma_{10,550} = \gamma_{15,775}$	
	$D^{f_0}_{v_5}$	$\beta_{v_5} = b_{v_5}$ $20 \cdot [t-20]^+ = 775$ $t = 58\frac{3}{4}$	$\beta_{v_5} = \alpha_{v_5}$ $20 \cdot [t-20]^+ = 15 \cdot t + 775$ $t = 235$
	$B^{f_0}_{v_5}$	$\alpha_{v_5}(T_{v_5}) = 15 \cdot 20 + 775$ $= 1075$	
$v_5 v_6$	$\alpha_{v_5 v_6} = (\alpha_{v_5})^*$	$= \gamma_{15,1075}$	
v_6	$\alpha_{v_6} = \alpha_{v_5 v_6}$	$= \gamma_{15,1075}$	
	$D^{f_0}_{v_6}$	$\beta_{v_6} = b_{v_6}$ $20 \cdot [t-20]^+ = 1075$ $t = 73\frac{3}{4}$	$\beta_{v_6} = \alpha_{v_6}$ $20 \cdot [t-20]^+ = 15 \cdot t + 1075$ $t = 295$
	$B^{f_0}_{v_6}$	$\alpha_{v_6}(T_{v_6}) = 15 \cdot 20 + 1075$ $= 1375$	
D^{f_0}		$= 197\frac{1}{2}$	$= 660$
B^{f_0}		$= 1375$	

$\text{computeSfaOutputBound}(v_0, f_1) = (\alpha_{v_0}^{f_1})^* = \alpha_{v_0v_1}^{f_1}$		FIFO_MUX	ARB_MUX
$= \text{computeOutputBound}(v_0, f_1) = (\alpha_{v_0}^{f_1})^* = \alpha_{v_0v_1}^{f_1}$		$= \gamma_{5,125}$	
$\text{computeSfaOutputBound}(v_1, f_1) = (\alpha_{v_1}^{f_1})^* = \alpha_{v_1v_2}^{f_1}$ flow of interest $= f_0$		FIFO_MUX	ARB_MUX
$\alpha_{v_0v_1}^{f_1}$		$= \gamma_{25,125}$	
$\alpha_{v_1}^{xf_1}$		$= \gamma_{0,0}$	
$\beta_{v_1}^{\text{l.o.}f_1} = [\beta_{v_1} - \alpha_{v_1}^{xf_1}]^+$		$= \beta_{20,20}$	
$\alpha_{v_1v_2}^{f_1} = \alpha_{v_1}^{f_1} \oslash \beta_{v_1}^{\text{l.o.}f_1} = \alpha_{v_0v_1}^{f_1} \oslash \beta_{v_1}^{\text{l.o.}f_1}$	$r_{v_1v_2}^{f_1}$	$= 5$	
	$b_{v_1v_2}^{f_1}$	$\alpha_{v_0v_1}^{f_1}(T_{v_1}^{\text{l.o.}f_1}) = 225$	
	$=$	$= \gamma_{5,225}$	
$\text{computeSfaOutputBound}(v_2, f_1) = (\alpha_{v_2}^{f_1})^* = \alpha_{v_1v_2}^{f_1}$ flow of interest $= f_0$		FIFO_MUX	ARB_MUX
$\alpha_{v_1v_2}^{f_1}$		$= \gamma_{5,225}$	
$\alpha_{v_2}^{xf_1}$		$= \gamma_{0,0}$	
$\beta_{v_2}^{\text{l.o.}f_1} = [\beta_{v_2} - \alpha_{v_2}^{xf_1}]^+$		$= \beta_{20,20}$	
$\alpha_{v_1v_2}^{f_1} = \alpha_{v_2}^{f_1} \oslash \beta_{v_2}^{\text{l.o.}f_1} = \alpha_{v_1v_2}^{f_1} \oslash \beta_{v_2}^{\text{l.o.}f_1}$	$r_{v_1v_2}^{f_1}$	$= 5$	
	$b_{v_1v_2}^{f_1}$	$\alpha_{v_1v_2}^{f_1}(T_{v_2}^{\text{l.o.}f_1}) = 5 \cdot 20 + 225 = 325$	
	$=$	$= \gamma_{5,325}$	
$\text{computeSfaOutputBound}(v_4, f_2) = (\alpha_{v_4}^{f_2})^* = \alpha_{v_4v_5}^{f_2}$ flow of interest $= f_0$		FIFO_MUX	ARB_MUX
$= \text{computeOutputBound}(v_4, f_2) = (\alpha_{v_4}^{f_2})^* = \alpha_{v_4v_5}^{f_2}$		$= \gamma_{5,225}$	
$\text{computeSfaOutputBound}(v_5, < f_1, f_2 >) = \alpha_{v_5v_6}^{<f_1,f_2>}$ flow of interest $= f_0$		FIFO_MUX	ARB_MUX
$\alpha_{v_5}^{<f_1,f_2>}$		$= \gamma_{5,225} + \gamma_{5,325} = \gamma_{10,550}$	
$\alpha_{v_5}^{x<f_1,f_2>}$		$= \gamma_{0,0}$	
$\beta_{v_5}^{\text{l.o.}<f_1,f_2>} = [\beta_{v_5} - \alpha_{v_5}^{x<f_1,f_2>}]^+$	$R_{v_5}^{\text{l.o.}<f_1,f_2>}$	$= 20$	
	$T_{v_5}^{\text{l.o.}<f_1,f_2>}$	$\beta_{v_5} = b_{v_5}^{x<f_1,f_2>}$ $20 \cdot [t-20]^+ = 550$ $t = 47\frac{1}{2}$	$\beta_{v_5} = \alpha_{v_5}^{x<f_1,f_2>}$ $20 \cdot [t-20]^+ = 10 \cdot t + 550$ $t = 95$
	$=$	$= \beta_{20,47\frac{1}{2}}$	$= \beta_{20,95}$
$\alpha_{v_5v_6}^{<f_1,f_2>} = \alpha_{v_5}^{<f_1,f_2>} \oslash \beta_{v_5}^{\text{l.o.}<f_1,f_2>}$	$r_{v_5v_6}^{<f_1,f_2>}$	$= 5$	
	$b_{v_5v_6}^{<f_1,f_2>}$	$\alpha_{v_5}^{<f_1,f_2>}(T_{v_5}^{\text{l.o.}<f_1,f_2>}) = 10 \cdot 20 + 550$	$\alpha_{v_5}^{<f_1,f_2>}(T_{v_5}^{\text{l.o.}<f_1,f_2>}) = 1500$
	$=$	$= \gamma_{10,750}$	$= \gamma_{10,1500}$

SFA FIFO_MUX:

$$
\begin{aligned}
\beta_{\text{e2e}}^{\text{l.o.}f_0} &= [\beta_{v_1}^{\text{SFA l.o.}xf_0} - \alpha_{v_1}^{xf_0}]^+ \otimes [\beta_{v_2}^{\text{SFA l.o.x}f_0} - \alpha_{v_2}^{xf_0}]^+ \otimes [\beta_{v_5}^{\text{SFA l.o.}xf_0} - \alpha_{v_5}^{xf_0}]^+ \otimes [\beta_{v_6}^{\text{SFA l.o.}xf_0} - \alpha_{v_6}^{xf_0}]^+ \\
&= [\beta_{v_1}^{\text{SFA l.o.}xf_0} - \alpha_{v_1}^{xf_0}]^+ \otimes [\beta_{v_2}^{\text{SFA l.o.x}f_0} - \alpha_{v_2}^{xf_0}]^+ \otimes [\beta_{v_5}^{\text{SFA l.o.}xf_0} - (\alpha_{v_2v_5}^{f_1} + \alpha_{v_4v_5}^{f_2})]^+ \otimes [\beta_{v_6}^{\text{SFA l.o.}xf_0} - \alpha_{v_6}^{<f_1,f_2>}]^+ \\
&= [\beta_{v_1} - \alpha_{v_1}^{f_1}]^+ \otimes [\beta_{v_2} - \alpha_{v_2}^{f_1}]^+ \otimes [\beta_{v_5} - (\alpha_{v_2v_5}^{f_1} + \alpha_{v_4v_5}^{f_2})]^+ \otimes [\beta_{v_6} - ((\alpha_{v_5}^{<f_1,f_2>}) \oslash \beta_{v_5}^{\text{SFA l.o.}<f_1,f_2>}]^+ \\
&= [\beta_{v_1} - \alpha_{v_1}^{f_1}]^+ \otimes [\beta_{v_2} - \alpha_{v_2}^{f_1}]^+ \otimes [\beta_{v_5} - (\alpha_{v_2v_5}^{f_1} + \alpha_{v_4v_5}^{f_2})]^+ \otimes [\beta_{v_6} - ((\alpha_{v_2v_5}^{f_1} + \alpha_{v_4v_5}^{f_2}) \oslash \beta_{v_5}^{\text{SFA l.o.}<f_1,f_2>}]^+ \\
&= [\beta_{v_1} - \alpha_{v_1}^{f_1}]^+ \otimes [\beta_{v_2} - \alpha_{v_2}^{f_1}]^+ \otimes [\beta_{v_5} - (\alpha_{v_2v_5}^{f_1} + \alpha_{v_4v_5}^{f_2})]^+ \otimes [\beta_{v_6} - ((\alpha_{v_2v_5}^{f_1} + \alpha_{v_4v_5}^{f_2}) \oslash (\beta_{v_5} - \alpha_{v_5}^{x<f_1,f_2>})]^+ \\
&= [\beta_{v_1} - \alpha_{v_1}^{f_1}]^+ \otimes [\beta_{v_2} - \alpha_{v_2}^{f_1}]^+ \otimes [\beta_{v_5} - (\alpha_{v_2v_5}^{f_1} + \alpha_{v_4v_5}^{f_2})]^+ \otimes [\beta_{v_6} - ((\alpha_{v_2v_5}^{f_1} + \alpha_{v_4v_5}^{f_2}) \oslash \beta_{v_5}]^+ \\
&= [\beta_{20,20} - \gamma_{5,125}]^+ \otimes [\beta_{20,20} - \gamma_{5,225}]^+ \otimes [\beta_{20,20} - (\gamma_{5,325} + \gamma_{5,225})]^+ \otimes [\beta_{20,20} - ((\gamma_{5,325} + \gamma_{5,225}) \oslash \beta_{20,20})]^+ \\
&= [\beta_{20,20} - \gamma_{5,125}]^+ \otimes [\beta_{20,20} - \gamma_{5,225}]^+ \otimes [\beta_{20,20} - \gamma_{10,550}]^+ \otimes [\beta_{20,20} - (\gamma_{10,550} \oslash \beta_{20,20})]^+ \\
&= [\beta_{20,20} - \gamma_{5,125}]^+ \otimes [\beta_{20,20} - \gamma_{5,225}]^+ \otimes [\beta_{20,20} - \gamma_{10,550}]^+ \otimes [\beta_{20,20} - \gamma_{10,750}]^+ \\
&= \beta_{15,26\frac{1}{4}} \otimes \beta_{15,31\frac{1}{4}} \otimes \beta_{10,47\frac{1}{2}} \otimes \beta_{10,57\frac{1}{2}} \\
&= \beta_{10,162\frac{1}{2}}
\end{aligned}
$$

$$
\begin{aligned}
D^{f_0} &= \frac{R_{\text{e2e}}^{\text{l.o.}f_0} \cdot T_{\text{e2e}}^{\text{l.o.}f_0} + b^{f_0}}{R_{\text{e2e}}^{\text{l.o.}f_0}} \\
&= \frac{10 \cdot 162\frac{1}{2} + 25}{10} \\
&= 165
\end{aligned}
$$

$$
\begin{aligned}
B^{f_0} &= \alpha^{f_0}(T_{\text{e2e}}^{\text{l.o.}f_0}) \\
&= 5 \cdot 162\frac{1}{2} + 25 \\
&= 837\frac{1}{2}
\end{aligned}
$$

SFA ARB_MUX:

$$
\begin{aligned}
\beta_{\text{e2e}}^{\text{l.o.}f_0} &= [\beta_{v_1}^{\text{SFA l.o.}xf_0} - \alpha_{v_1}^{xf_0}]^+ \otimes [\beta_{v_2}^{\text{SFA l.o.x}f_0} - \alpha_{v_2}^{xf_0}]^+ \otimes [\beta_{v_5}^{\text{SFA l.o.}xf_0} - \alpha_{v_5}^{xf_0}]^+ \otimes [\beta_{v_6}^{\text{SFA l.o.}xf_0} - \alpha_{v_6}^{xf_0}]^+ \\
&= [\beta_{v_1}^{\text{SFA l.o.}xf_0} - \alpha_{v_1}^{xf_0}]^+ \otimes [\beta_{v_2}^{\text{SFA l.o.x}f_0} - \alpha_{v_2}^{xf_0}]^+ \otimes [\beta_{v_5}^{\text{SFA l.o.}xf_0} - (\alpha_{v_2v_5}^{f_1} + \alpha_{v_4v_5}^{f_2})]^+ \otimes [\beta_{v_6}^{\text{SFA l.o.}xf_0} - \alpha_{v_6}^{<f_1,f_2>}]^+ \\
&= [\beta_{v_1} - \alpha_{v_1}^{f_1}]^+ \otimes [\beta_{v_2} - \alpha_{v_2}^{f_1}]^+ \otimes [\beta_{v_5} - (\alpha_{v_2v_5}^{f_1} + \alpha_{v_4v_5}^{f_2})]^+ \otimes [\beta_{v_6} - ((\alpha_{v_5}^{<f_1,f_2>}) \oslash \beta_{v_5}^{\text{SFA l.o.}<f_1,f_2>}]^+ \\
&= [\beta_{v_1} - \alpha_{v_1}^{f_1}]^+ \otimes [\beta_{v_2} - \alpha_{v_2}^{f_1}]^+ \otimes [\beta_{v_5} - (\alpha_{v_2v_5}^{f_1} + \alpha_{v_4v_5}^{f_2})]^+ \otimes [\beta_{v_6} - ((\alpha_{v_2v_5}^{f_1} + \alpha_{v_4v_5}^{f_2}) \oslash \beta_{v_5}^{\text{SFA l.o.}<f_1,f_2>}]^+ \\
&= [\beta_{v_1} - \alpha_{v_1}^{f_1}]^+ \otimes [\beta_{v_2} - \alpha_{v_2}^{f_1}]^+ \otimes [\beta_{v_5} - (\alpha_{v_2v_5}^{f_1} + \alpha_{v_4v_5}^{f_2})]^+ \otimes [\beta_{v_6} - ((\alpha_{v_2v_5}^{f_1} + \alpha_{v_4v_5}^{f_2}) \oslash (\beta_{v_5} - \alpha_{v_5}^{x<f_1,f_2>})]^+ \\
&= [\beta_{v_1} - \alpha_{v_1}^{f_1}]^+ \otimes [\beta_{v_2} - \alpha_{v_2}^{f_1}]^+ \otimes [\beta_{v_5} - (\alpha_{v_2v_5}^{f_1} + \alpha_{v_4v_5}^{f_2})]^+ \otimes [\beta_{v_6} - ((\alpha_{v_2v_5}^{f_1} + \alpha_{v_4v_5}^{f_2}) \oslash \beta_{v_5}]^+ \\
&= [\beta_{20,20} - \gamma_{5,125}]^+ \otimes [\beta_{20,20} - \gamma_{5,225}]^+ \otimes [\beta_{20,20} - (\gamma_{5,325} + \gamma_{5,225})]^+ \otimes [\beta_{20,20} - ((\gamma_{5,325} + \gamma_{5,225}) \oslash \beta_{20,20})]^+ \\
&= [\beta_{20,20} - \gamma_{5,125}]^+ \otimes [\beta_{20,20} - \gamma_{5,225}]^+ \otimes [\beta_{20,20} - \gamma_{10,550}]^+ \otimes [\beta_{20,20} - (\gamma_{10,550} \oslash \beta_{20,20})]^+ \\
&= [\beta_{20,20} - \gamma_{5,125}]^+ \otimes [\beta_{20,20} - \gamma_{5,225}]^+ \otimes [\beta_{20,20} - \gamma_{10,550}]^+ \otimes [\beta_{20,20} - \gamma_{10,750}]^+ \\
&= \beta_{15,35} \otimes \beta_{15,41\frac{2}{3}} \otimes \beta_{10,95} \otimes \beta_{10,115} \\
&= \beta_{10,286\frac{2}{3}}
\end{aligned}
$$

$$
\begin{aligned}
D^{f_0} &= \frac{R_{\text{e2e}}^{\text{l.o.}f_0} \cdot T_{\text{e2e}}^{\text{l.o.}f_0} + b^{f_0}}{R_{\text{e2e}}^{\text{l.o.}f_0}} \\
&= \frac{10 \cdot 286\frac{2}{3} + 25}{10} \\
&= 289\frac{1}{6}
\end{aligned}
$$

$$
\begin{aligned}
B^{f_0} &= \alpha^{f_0}(T_{\text{e2e}}^{\text{l.o.}f_0}) \\
&= 5 \cdot 286\frac{2}{3} + 25 \\
&= 1458\frac{1}{3}
\end{aligned}
$$

PMOO:

$$
\begin{aligned}
\beta_{\text{e2e}}^{\text{l.o.}f_0} &= [((\beta_{v_1} \otimes \beta_{v_2}) \otimes [(\beta_{v_5} \otimes \beta_{v_6}) - (\alpha^{f_2} \oslash (\beta_{v_3} \otimes \beta_{v_4}))]^+) - (\alpha^{f_1} \oslash \beta_{v_0})]^+ \\
&= [((\beta_{20,20} \otimes \beta_{20,20}) \otimes [(\beta_{20,20} \otimes \beta_{20,20}) - (\gamma_{5,25} \oslash (\beta_{20,20} \otimes \beta_{20,20}))]^+) - (\gamma_{5,25} \oslash \beta_{20,20})]^+ \\
&= [(\beta_{20,40} \otimes [\beta_{20,40} - (\gamma_{5,25} \oslash \beta_{20,40})]^+) - (\gamma_{5,25} \oslash \beta_{20,20})]^+ \\
&= [(\beta_{20,40} \otimes [\beta_{20,40} - \gamma_{5,225}]^+) - \gamma_{5,125}]^+ \\
&= [(\beta_{20,40} \otimes \beta_{15,68\frac{1}{3}}) - \gamma_{5,125}]^+ \\
&= [\beta_{15,108\frac{1}{3}} - \gamma_{5,125}]^+ \\
&= \beta_{10,175}
\end{aligned}
$$

$$
\begin{aligned}
D^{f_0} &= \frac{R_{\text{e2e}}^{\text{l.o.}f_0} \cdot T_{\text{e2e}}^{\text{l.o.}f_0} + b^{f_0}}{R_{\text{e2e}}^{\text{l.o.}f_0}} \\
&= \frac{10 \cdot 175 + 25}{10} \\
&= \frac{1775}{10} \\
&= 177\frac{1}{2}
\end{aligned}
$$

$$
\begin{aligned}
B^{f_0} &= \alpha^{f_0}(T_{\text{e2e}}^{\text{l.o.}f_0}) \\
&= 5 \cdot 175 + 25 \\
&= 900
\end{aligned}
$$

Flow f_1

TFA		FIFO_MUX	ARB_MUX
v_0	$\alpha_{v_1} = \alpha^{f_1}$	$= \gamma_{5,25}$	
	$D_{v_0}^{f_1}$	$\beta_{v_0} = b_{v_0}$ $20 \cdot [t-20]^+ = 25$ $t = 21\frac{1}{4}$	FIFO per micro flow $\beta_{v_0} = b_{v_0}$ $20 \cdot [t-20]^+ = 25$ $t = 21\frac{1}{4}$
	$B_{v_0}^{f_1}$	$\alpha_{v_0}(T_{v_0}) = 5 \cdot 20 + 25$ $= 125$	
v_0v_1	$\alpha_{v_0v_1}$	$= \gamma_{5,125}$	
v_1	$\alpha_{v_1} = \alpha^{f_0} + \alpha_{v_0v_1}^{f_1}$	$= \gamma_{5,25} + \gamma_{5,125} = \gamma_{10,150}$	
	$D_{v_1}^{f_1}$	$= 27\frac{1}{2}$	$= 55$
	$B_{v_1}^{f_1}$	$= 350$	
v_1v_2	$\alpha_{v_1v_2} = (\alpha_{v_1})^*$	$= \gamma_{10,350}$	
v_2	$\alpha_{v_2} = \alpha_{v_1v_2}$	$= \gamma_{10,350}$	
	$D_{v_2}^{f_1}$	$= 37\frac{1}{2}$	$= 75$
	$B_{v_2}^{f_1}$	$= 550$	
v_2v_5	$\alpha_{v_2v_5} = (\alpha_{v_2})^*$	$= \gamma_{10,550}$	
v_4v_5	$\alpha_{v_4v_5} = \alpha_{v_4v_5}^{f_2}$	$= \gamma_{5,225}$	
v_5	$\alpha_{v_5} = \alpha_{v_4v_5} + \alpha_{v_2v_5}$	$= \gamma_{5,225} + \gamma_{10,550} = \gamma_{15,775}$	
	$D_{v_5}^{f_1}$	$= 58\frac{3}{4}$	$= 235$
	$B_{v_5}^{f_1}$	$= 1075$	
v_5v_6	$\alpha_{v_5v_6} = (\alpha_{v_5})^*$	$= \gamma_{15,1075}$	
v_6	$\alpha_{v_6} = \alpha_{v_5v_6}$	$= \gamma_{15,1075}$	
	$D_{v_6}^{f_1}$	$= 73\frac{3}{4}$	$= 295$
	$B_{v_6}^{f_1}$	$= 1375$	
D^{f_1}		$= 197\frac{1}{2} + 21\frac{1}{4} = 218\frac{3}{4}$	$= 660 + 21\frac{1}{4} = 681\frac{1}{4}$
B^{f_1}		$= 1375$	

SFA FIFO_MUX:

$$
\begin{aligned}
\beta_{\text{e2e}}^{\text{l.o.}f_1} &= [\beta_{v_0}^{\text{SFA l.o.}xf_1} - \alpha_{v_0}^{xf_1}]^+ \otimes [\beta_{v_1}^{\text{SFA l.o.}xf_1} - \alpha_{v_1}^{xf_1}]^+ \otimes [\beta_{v_2}^{\text{SFA l.o.}xf_1} - \alpha_{v_2}^{xf_1}]^+ \otimes [\beta_{v_5}^{\text{SFA l.o.}xf_1} - \alpha_{v_5}^{xf_1}]^+ \otimes [\beta_{v_6}^{\text{SFA l.o.}xf_1} - \alpha_{v_6}^{xf_1}]^+ \\
&= [\beta_{v_0}^{\text{SFA l.o.}xf_1} - \alpha_{v_0}^{xf_1}]^+ \otimes [\beta_{v_1}^{\text{SFA l.o.}xf_1} - \alpha_{v_1}^{xf_1}]^+ \otimes [\beta_{v_2}^{\text{SFA l.o.}xf_1} - (\alpha_{v_1}^{xf_1} \otimes \oslash \beta_{v_1}^{\text{SFA l.o.}xf_1})]^+ \otimes [\beta_{v_5}^{\text{SFA l.o.}xf_1} - \alpha_{v_5}^{xf_1}]^+ \otimes [\beta_{v_6}^{\text{SFA l.o.}xf_1} - (\alpha_{v_5}^{xf_1} \oslash \beta_{v_5}^{\text{SFA l.o.}xf_1})]^+ \\
&= \beta_{v_0} \otimes [\beta_{v_1} - \alpha^{f_0}]^+ \otimes [\beta_{v_2} - (\alpha^{f_0} \oslash \beta_{v_1})]^+ \otimes [\beta_{v_5} - \alpha_{v_5}^{xf_1}]^+ \otimes [\beta_{v_6} - (\alpha_{v_5}^{xf_1} \oslash \beta_{v_5}^{\text{SFA l.o.}xf_1})]^+ \\
&= \beta_{v_0} \otimes [\beta_{v_1} - \alpha^{f_0}]^+ \otimes [\beta_{v_2} - (\alpha^{f_0} \oslash \beta_{v_1})]^+ \otimes [\beta_{v_5} - (\alpha_{v_5}^{f_0} + \alpha_{v_5}^{f_2})]^+ \otimes [\beta_{v_6} - ((\alpha_{v_5}^{f_0} + \alpha_{v_5}^{f_2}) \oslash \beta_{v_5}^{\text{SFA l.o.}<f_0,f_2>})]^+ \\
&= \beta_{v_0} \otimes [\beta_{v_1} - \alpha^{f_0}]^+ \otimes [\beta_{v_2} - (\alpha^{f_0} \oslash \beta_{v_1})]^+ \otimes [\beta_{v_5} - (\alpha_{v_5}^{f_0} + \alpha_{v_5}^{f_2})]^+ \otimes [\beta_{v_6} - ((\alpha_{v_5}^{f_0} + \alpha_{v_5}^{f_2}) \oslash \beta_{v_5})]^+ \\
&= \beta_{v_0} \otimes [\beta_{v_1} - \alpha^{f_0}]^+ \otimes [\beta_{v_2} - (\alpha^{f_0} \oslash \beta_{v_1})]^+ \otimes [\beta_{v_5} - (\alpha_{v_2v_5}^{f_0} + \alpha_{v_4v_5}^{f_2})]^+ \otimes [\beta_{v_6} - ((\alpha_{v_2v_5}^{f_0} + \alpha_{v_4v_5}^{f_2}) \oslash \beta_{v_5})]^+ \\
&= \beta_{v_0} \otimes [\beta_{v_1} - \alpha^{f_0}]^+ \otimes [\beta_{v_2} - (\alpha^{f_0} \oslash \beta_{v_1})]^+ \otimes [\beta_{v_5} - (\alpha_{v_2v_5}^{f_0} + (\alpha_{v_4}^{f_2} \oslash \beta_{v_4}))]^+ \otimes [\beta_{v_6} - ((\alpha_{v_2v_5}^{f_0} + (\alpha_{v_4}^{f_2} \oslash \beta_{v_4})) \oslash \beta_{v_5})]^+ \\
&= \beta_{v_0} \otimes [\beta_{v_1} - \alpha^{f_0}]^+ \otimes [\beta_{v_2} - (\alpha^{f_0} \oslash \beta_{v_1})]^+ \otimes [\beta_{v_5} - (\alpha_{v_2v_5}^{f_0} + ((\alpha^{f_2} \oslash \beta_{v_3}) \oslash \beta_{v_4}))]^+ \otimes [\beta_{v_6} - ((\alpha_{v_2v_5}^{f_0} + ((\alpha^{f_2} \oslash \beta_{v_3}) \oslash \beta_{v_4})) \oslash \beta_{v_5})]^+ \\
&= \beta_{v_0} \otimes [\beta_{v_1} - \alpha^{f_0}]^+ \otimes [\beta_{v_2} - (\alpha^{f_0} \oslash \beta_{v_1})]^+ \otimes [\beta_{v_5} - ((\alpha_{v_2}^{f_0} \oslash \beta_{v_2}^{\text{SFA l.o.}f_0}) + ((\alpha^{f_2} \oslash \beta_{v_3}) \oslash \beta_{v_4}))]^+ \otimes [\beta_{v_6} - ((\alpha_{v_2v_5}^{f_0} + ((\alpha^{f_2} \oslash \beta_{v_3}) \oslash \beta_{v_4})) \oslash \beta_{v_5})]^+ \\
&= \beta_{v_0} \otimes [\beta_{v_1} - \alpha^{f_0}]^+ \otimes [\beta_{v_2} - (\alpha^{f_0} \oslash \beta_{v_1})]^+ \otimes [\beta_{v_5} - ((\alpha_{v_2}^{f_0} \oslash \beta_{v_2}) + ((\alpha^{f_2} \oslash \beta_{v_3}) \oslash \beta_{v_4}))]^+ \otimes [\beta_{v_6} - (((\alpha_{v_2}^{f_0} \oslash \beta_{v_2}) + ((\alpha^{f_2} \oslash \beta_{v_3}) \oslash \beta_{v_4})) \oslash \beta_{v_5})]^+ \\
&= \beta_{v_0} \otimes [\beta_{v_1} - \alpha^{f_0}]^+ \otimes [\beta_{v_2} - (\alpha^{f_0} \oslash \beta_{v_1})]^+ \\
&\quad \otimes [\beta_{v_5} - (((\alpha^{f_0} \oslash \beta_{v_1}^{\text{SFA l.o.}f_0}) \oslash \beta_{v_2}) + ((\alpha^{f_2} \oslash \beta_{v_3}) \oslash \beta_{v_4}))]^+ \otimes [\beta_{v_6} - ((((\alpha^{f_0} \oslash \beta_{v_1}^{\text{SFA l.o.}f_0}) \oslash \beta_{v_2}) + ((\alpha^{f_2} \oslash \beta_{v_3}) \oslash \beta_{v_4})) \oslash \beta_{v_5})]^+ \\
&= \beta_{v_0} \otimes [\beta_{v_1} - \alpha^{f_0}]^+ \otimes [\beta_{v_2} - (\alpha^{f_0} \oslash \beta_{v_1})]^+ \\
&\quad \otimes [\beta_{v_5} - (((\alpha^{f_0} \oslash \beta_{v_1}) \oslash \beta_{v_2}) + ((\alpha^{f_2} \oslash \beta_{v_3}) \oslash \beta_{v_4}))]^+ \otimes [\beta_{v_6} - ((((\alpha^{f_0} \oslash \beta_{v_1}) \oslash \beta_{v_2}) + ((\alpha^{f_2} \oslash \beta_{v_3}) \oslash \beta_{v_4})) \oslash \beta_{v_5})]^+ \\
&= \beta_{20,20} \otimes [\beta_{20,20} - \gamma_{5,25}]^+ \otimes [\beta_{20,20} - (\gamma_{5,25} \oslash \beta_{20,20})]^+ \\
&\quad \otimes [\beta_{20,20} - (((\gamma_{5,25} \oslash \beta_{20,20}) \oslash \beta_{20,20}) + ((\gamma_{5,25} \oslash \beta_{20,20}) \oslash \beta_{20,20}))]^+ \otimes [\beta_{20,20} - ((((\gamma_{5,25} \oslash \beta_{20,20}) \oslash \beta_{20,20}) + ((\gamma_{5,25} \oslash \beta_{20,20}) \oslash \beta_{20,20})) \oslash \beta_{20,20})]^+ \\
&= \beta_{20,20} \otimes \beta_{20,21\frac{1}{4}} \otimes [\beta_{20,20} - \gamma_{5,125}]^+ \otimes [\beta_{20,20} - ((\gamma_{5,125} \oslash \beta_{20,20}) + (\gamma_{5,125} \oslash \beta_{20,20}))]^+ \otimes [\beta_{20,20} - (((\gamma_{5,125} \oslash \beta_{20,20}) + (\gamma_{5,125} \oslash \beta_{20,20})) \oslash \beta_{20,20})]^+ \\
&= \beta_{20,20} \otimes \beta_{15,21\frac{1}{4}} \otimes \beta_{15,26\frac{1}{4}} \otimes [\beta_{20,20} - (\gamma_{5,225} + \gamma_{5,225})]^+ \otimes [\beta_{20,20} - ((\gamma_{5,225} + \gamma_{5,225}) \oslash \beta_{20,20})]^+ \\
&= \beta_{20,20} \otimes \beta_{15,21\frac{1}{4}} \otimes \beta_{15,26\frac{1}{4}} \otimes [\beta_{20,20} - \gamma_{10,450}]^+ \otimes [\beta_{20,20} - (\gamma_{10,450} \oslash \beta_{20,20})]^+ \\
&= \beta_{20,20} \otimes \beta_{15,21\frac{1}{4}} \otimes \beta_{15,26\frac{1}{4}} \otimes \beta_{10,42\frac{1}{2}} \otimes [\beta_{20,20} - \gamma_{10,550}]^+ \\
&= \beta_{20,20} \otimes \beta_{15,21\frac{1}{4}} \otimes \beta_{15,26\frac{1}{4}} \otimes \beta_{10,42\frac{1}{2}} \otimes \beta_{10,52\frac{1}{2}} \\
&= \beta_{10,162\frac{1}{2}}
\end{aligned}
$$

$$
\begin{aligned}
D^{f_1} &= \frac{R_{\text{e2e}}^{\text{l.o.}f_1} \cdot T_{\text{e2e}}^{\text{l.o.}f_1} + b^{f_1}}{R_{\text{e2e}}^{\text{l.o.}f_1}} \\
&= \frac{10 \cdot 162\frac{1}{2} + 25}{10} \\
&= 165 \\
B^{f_1} &= \alpha^{f_1}(T_{\text{e2e}}^{\text{l.o.}f_1}) \\
&= 5 \cdot 162\frac{1}{2} + 25 \\
&= 837\frac{1}{2}
\end{aligned}
$$

SFA ARB_MUX:

$$
\begin{aligned}
\beta_{\text{e2e}}^{\text{l.o.}f_1} &= [\beta_{v_0}^{\text{SFA l.o.}xf_1} - \alpha_{v_0}^{xf_1}]^+ \otimes [\beta_{v_1}^{\text{SFA l.o.}xf_1} - \alpha_{v_1}^{xf_1}]^+ \otimes [\beta_{v_2}^{\text{SFA l.o.}xf_1} - \alpha_{v_2}^{xf_1}]^+ \otimes [\beta_{v_5}^{\text{SFA l.o.}xf_1} - \alpha_{v_5}^{xf_1}]^+ \otimes [\beta_{v_6}^{\text{SFA l.o.}xf_1} - \alpha_{v_6}^{xf_1}]^+ \\
&= [\beta_{v_0}^{\text{SFA l.o.}xf_1} - \alpha_{v_0}^{xf_1}]^+ \otimes [\beta_{v_1}^{\text{SFA l.o.}xf_1} - \alpha_{v_1}^{xf_1}]^+ \otimes [\beta_{v_2}^{\text{SFA l.o.}xf_1} - (\alpha_{v_1}^{xf_1} \otimes \oslash \beta_{v_1}^{\text{SFA l.o.}xf_1})]^+ \otimes [\beta_{v_5}^{\text{SFA l.o.}xf_1} - \alpha_{v_5}^{xf_1}]^+ \otimes [\beta_{v_6}^{\text{SFA l.o.}xf_1} - (\alpha_{v_5}^{xf_1} \oslash \beta_{v_5}^{\text{SFA l.o.}xf_1})]^+ \\
&= \beta_{v_0} \otimes [\beta_{v_1} - \alpha^{f_0}]^+ \otimes [\beta_{v_2} - (\alpha^{f_0} \oslash \beta_{v_1})]^+ \otimes [\beta_{v_5} - \alpha_{v_5}^{xf_1}]^+ \otimes [\beta_{v_6} - (\alpha_{v_5}^{xf_1} \oslash \beta_{v_5}^{\text{SFA l.o.}xf_1})]^+ \\
&= \beta_{v_0} \otimes [\beta_{v_1} - \alpha^{f_0}]^+ \otimes [\beta_{v_2} - (\alpha^{f_0} \oslash \beta_{v_1})]^+ \otimes [\beta_{v_5} - (\alpha_{v_5}^{f_0} + \alpha_{v_5}^{f_2})]^+ \otimes [\beta_{v_6} - ((\alpha_{v_5}^{f_0} + \alpha_{v_5}^{f_2}) \oslash \beta_{v_5}^{\text{SFA l.o.}<f_0,f_2>})]^+ \\
&= \beta_{v_0} \otimes [\beta_{v_1} - \alpha^{f_0}]^+ \otimes [\beta_{v_2} - (\alpha^{f_0} \oslash \beta_{v_1})]^+ \otimes [\beta_{v_5} - (\alpha_{v_5}^{f_0} + \alpha_{v_5}^{f_2})]^+ \otimes [\beta_{v_6} - ((\alpha_{v_5}^{f_0} + \alpha_{v_5}^{f_2}) \oslash \beta_{v_5})]^+ \\
&= \beta_{v_0} \otimes [\beta_{v_1} - \alpha^{f_0}]^+ \otimes [\beta_{v_2} - (\alpha^{f_0} \oslash \beta_{v_1})]^+ \otimes [\beta_{v_5} - (\alpha_{v_2v_5}^{f_0} + \alpha_{v_4v_5}^{f_2})]^+ \otimes [\beta_{v_6} - ((\alpha_{v_2v_5}^{f_0} + \alpha_{v_4v_5}^{f_2}) \oslash \beta_{v_5})]^+ \\
&= \beta_{v_0} \otimes [\beta_{v_1} - \alpha^{f_0}]^+ \otimes [\beta_{v_2} - (\alpha^{f_0} \oslash \beta_{v_1})]^+ \otimes [\beta_{v_5} - (\alpha_{v_2v_5}^{f_0} + (\alpha_{v_4}^{f_2} \oslash \beta_{v_4}))]^+ \otimes [\beta_{v_6} - ((\alpha_{v_2v_5}^{f_0} + (\alpha_{v_4}^{f_2} \oslash \beta_{v_4})) \oslash \beta_{v_5})]^+ \\
&= \beta_{v_0} \otimes [\beta_{v_1} - \alpha^{f_0}]^+ \otimes [\beta_{v_2} - (\alpha^{f_0} \oslash \beta_{v_1})]^+ \otimes [\beta_{v_5} - (\alpha_{v_2v_5}^{f_0} + ((\alpha^{f_2} \oslash \beta_{v_3}) \oslash \beta_{v_4}))]^+ \otimes [\beta_{v_6} - ((\alpha_{v_2v_5}^{f_0} + ((\alpha^{f_2} \oslash \beta_{v_3}) \oslash \beta_{v_4})) \oslash \beta_{v_5})]^+ \\
&= \beta_{v_0} \otimes [\beta_{v_1} - \alpha^{f_0}]^+ \otimes [\beta_{v_2} - (\alpha^{f_0} \oslash \beta_{v_1})]^+ \otimes [\beta_{v_5} - ((\alpha_{v_2}^{f_0} \oslash \beta_{v_2}^{\text{SFA l.o.}f_0}) + ((\alpha^{f_2} \oslash \beta_{v_3}) \oslash \beta_{v_4}))]^+ \otimes [\beta_{v_6} - ((\alpha_{v_2v_5}^{f_0} + ((\alpha^{f_2} \oslash \beta_{v_3}) \oslash \beta_{v_4})) \oslash \beta_{v_5})]^+ \\
&= \beta_{v_0} \otimes [\beta_{v_1} - \alpha^{f_0}]^+ \otimes [\beta_{v_2} - (\alpha^{f_0} \oslash \beta_{v_1})]^+ \otimes [\beta_{v_5} - ((\alpha_{v_2}^{f_0} \oslash \beta_{v_2}) + ((\alpha^{f_2} \oslash \beta_{v_3}) \oslash \beta_{v_4}))]^+ \otimes [\beta_{v_6} - (((\alpha_{v_2}^{f_0} \oslash \beta_{v_2}) + ((\alpha^{f_2} \oslash \beta_{v_3}) \oslash \beta_{v_4})) \oslash \beta_{v_5})]^+ \\
&= \beta_{v_0} \otimes [\beta_{v_1} - \alpha^{f_0}]^+ \otimes [\beta_{v_2} - (\alpha^{f_0} \oslash \beta_{v_1})]^+ \\
&\quad \otimes [\beta_{v_5} - (((\alpha^{f_0} \oslash \beta_{v_1}^{\text{SFA l.o.}f_0}) \oslash \beta_{v_2}) + ((\alpha^{f_2} \oslash \beta_{v_3}) \oslash \beta_{v_4}))]^+ \otimes [\beta_{v_6} - ((((\alpha^{f_0} \oslash \beta_{v_1}^{\text{SFA l.o.}f_0}) \oslash \beta_{v_2}) + ((\alpha^{f_2} \oslash \beta_{v_3}) \oslash \beta_{v_4})) \oslash \beta_{v_5})]^+ \\
&= \beta_{v_0} \otimes [\beta_{v_1} - \alpha^{f_0}]^+ \otimes [\beta_{v_2} - (\alpha^{f_0} \oslash \beta_{v_1})]^+ \\
&\quad \otimes [\beta_{v_5} - (((\alpha^{f_0} \oslash \beta_{v_1}) \oslash \beta_{v_2}) + ((\alpha^{f_2} \oslash \beta_{v_3}) \oslash \beta_{v_4}))]^+ \otimes [\beta_{v_6} - ((((\alpha^{f_0} \oslash \beta_{v_1}) \oslash \beta_{v_2}) + ((\alpha^{f_2} \oslash \beta_{v_3}) \oslash \beta_{v_4})) \oslash \beta_{v_5})]^+ \\
&= \beta_{20,20} \otimes [\beta_{20,20} - \gamma_{5,25}]^+ \otimes [\beta_{20,20} - (\gamma_{5,25} \oslash \beta_{20,20})]^+ \\
&\quad \otimes [\beta_{20,20} - (((\gamma_{5,25} \oslash \beta_{20,20}) \oslash \beta_{20,20}) + ((\gamma_{5,25} \oslash \beta_{20,20}) \oslash \beta_{20,20}))]^+ \otimes [\beta_{20,20} - ((((\gamma_{5,25} \oslash \beta_{20,20}) \oslash \beta_{20,20}) + ((\gamma_{5,25} \oslash \beta_{20,20}) \oslash \beta_{20,20})) \oslash \beta_{20,20})]^+ \\
&= \beta_{20,20} \otimes \beta_{20,28\frac{1}{3}} \otimes [\beta_{20,20} - \gamma_{5,125}]^+ \otimes [\beta_{20,20} - ((\gamma_{5,125} \oslash \beta_{20,20}) + (\gamma_{5,125} \oslash \beta_{20,20}))]^+ \otimes [\beta_{20,20} - (((\gamma_{5,125} \oslash \beta_{20,20}) + (\gamma_{5,125} \oslash \beta_{20,20})) \oslash \beta_{20,20})]^+ \\
&= \beta_{20,20} \otimes \beta_{15,28\frac{1}{3}} \otimes \beta_{15,35} \otimes [\beta_{20,20} - (\gamma_{5,225} + \gamma_{5,225})]^+ \otimes [\beta_{20,20} - ((\gamma_{5,225} + \gamma_{5,225}) \oslash \beta_{20,20})]^+ \\
&= \beta_{20,20} \otimes \beta_{15,28\frac{1}{3}} \otimes \beta_{15,35} \otimes [\beta_{20,20} - \gamma_{10,450}]^+ \otimes [\beta_{20,20} - (\gamma_{10,450} \oslash \beta_{20,20})]^+ \\
&= \beta_{20,20} \otimes \beta_{15,28\frac{1}{3}} \otimes \beta_{15,35} \otimes \beta_{10,85} \otimes [\beta_{20,20} - \gamma_{10,650}]^+ \\
&= \beta_{20,20} \otimes \beta_{15,28\frac{1}{3}} \otimes \beta_{15,35} \otimes \beta_{10,85} \otimes \beta_{10,95} \\
&= \beta_{10,273\frac{1}{3}} \\
D^{f_1} &= \frac{R_{\text{e2e}}^{\text{l.o.}f_1} \cdot T_{\text{e2e}}^{\text{l.o.}f_1} + b^{f_1}}{R_{\text{e2e}}^{\text{l.o.}f_1}} \\
&= \frac{10 \cdot 273\frac{1}{3} + 25}{10} \\
&= 275\frac{5}{6} \\
B^{f_1} &= \alpha^{f_1}(T_{\text{e2e}}^{\text{l.o.}f_1}) \\
&= 5 \cdot 273\frac{1}{3} + 25 \\
&= 1391\frac{2}{3}
\end{aligned}
$$

PMOO:

$$
\begin{aligned}
\beta_{\mathrm{e2e}}^{\mathrm{l.o.}f_1} &= \beta_{v_0} \otimes [((\beta_{v_1} \otimes \beta_{v_2}) \otimes [(\beta_{v_5} \otimes \beta_{v_6}) - (\alpha^{f_2} \oslash (\beta_{v_3} \otimes \beta_{v_4}))]^+) - \alpha^{f_1}]^+ \\
&= \beta_{20,20} \otimes [((\beta_{20,20} \otimes \beta_{20,20}) \otimes [(\beta_{20,20} \otimes \beta_{20,20}) - (\gamma_{5,25} \oslash (\beta_{20,20} \otimes \beta_{20,20}))]^+) - \gamma_{5,25}]^+ \\
&= \beta_{20,20} \otimes [(\beta_{20,40} \otimes [\beta_{20,40} - (\gamma_{5,25} \oslash \beta_{20,40})]^+) - \gamma_{5,25}]^+ \\
&= \beta_{20,20} \otimes [(\beta_{20,40} \otimes [\beta_{20,40} - \gamma_{5,225}]^+) - \gamma_{5,25}]^+ \\
&= \beta_{20,20} \otimes [(\beta_{20,40} \otimes \beta_{15,68\frac{1}{3}}) - \gamma_{5,25}]^+ \\
&= \beta_{20,20} \otimes [\beta_{15,108\frac{1}{3}} - \gamma_{5,25}]^+ \\
&= \beta_{20,20} \otimes \beta_{15,165} \\
&= \beta_{20,185}
\end{aligned}
$$

$$
\begin{aligned}
D^{f_1} &= \frac{R_{\mathrm{e2e}}^{\mathrm{l.o.}f_1} \cdot T_{\mathrm{e2e}}^{\mathrm{l.o.}f_1} + b^{f_1}}{R_{\mathrm{e2e}}^{\mathrm{l.o.}f_1}} \\
&= \frac{10 \cdot 185 + 25}{10} \\
&= \frac{1875}{10} \\
&= 187\frac{1}{2}
\end{aligned}
$$

$$
\begin{aligned}
B^{f_1} &= \alpha^{f_1}(T_{\mathrm{e2e}}^{\mathrm{l.o.}f_1}) \\
&= 5 \cdot 185 + 25 \\
&= 950
\end{aligned}
$$

Flow f_2

TFA		FIFO_MUX	ARB_MUX
v_3	$\alpha_{v_3} = \alpha^{f_2}$	$= \gamma_{5,25}$	
	$D_{v_3}^{f_2}$	$\beta_{v_3} = b_{v_3}$ $20 \cdot [t-20]^+ = 25$ $t = 21\frac{1}{4}$	FIFO per micro flow $\beta_{v_3} = b_{v_3}$ $20 \cdot [t-20]^+ = 25$ $t = 21\frac{1}{4}$
	$B_{v_3}^{f_2}$	$\alpha_{v_3}(T_{v_3}) = 5 \cdot 20 + 25$ $= 125$	
v_3v_4	$\alpha_{v_3v_4}$	$= \gamma_{5,125}$	
v_4	$\alpha_{v_4} = \alpha_{v_3v_4}$	$= \gamma_{5,125}$	
	$D_{v_4}^{f_2}$	$\beta_{v_4} = b_{v_4}$ $20 \cdot [t-20]^+ = 125$ $t = 26\frac{1}{4}$	FIFO per micro flow $\beta_{v_4} = b_{v_4}$ $20 \cdot [t-20]^+ = 125$ $t = 26\frac{1}{4}$
	$B_{v_4}^{f_2}$	$\alpha_{v_4}(T_{v_4}) = 5 \cdot 20 + 125$ $= 225$	
v_4v_5	$\alpha_{v_4v_5} = (\alpha_{v_4})^*$	$= \gamma_{5,225}$	
v_2v_5	$\alpha_{v_2v_5} = (\alpha_{v_2})^*$	$= \gamma_{10,550}$	
v_5	$\alpha_{v_5} = \alpha_{v_4v_5} + \alpha_{v_2v_5}$	$= \gamma_{5,225} + \gamma_{10,550} = \gamma_{15,775}$	
	$D_{v_5}^{f_2}$	$= 58\frac{3}{4}$	$= 235$
	$B_{v_5}^{f_2}$	$= 1075$	
v_5v_6	$\alpha_{v_5v_6} = (\alpha_{v_5})^*$	$= \gamma_{15,1075}$	
v_6	$\alpha_{v_6} = \alpha_{v_5v_6}$	$= \gamma_{15,1075}$	
	$D_{v_6}^{f_2}$	$= 73\frac{3}{4}$	$= 295$
	$B_{v_6}^{f_2}$	$= 1375$	
D^{f_2}		$= 180$	$= 577\frac{1}{2}$
B^{f_2}		$= 1375$	

SFA FIFO_MUX:

$$
\begin{aligned}
\beta_{\text{e2e}}^{\text{l.o.}f_2} &= [\beta_{v_3}^{\text{SFA l.o.}xf_2} - \alpha_{v_3}^{xf_2}]^+ \otimes [\beta_{v_4}^{\text{SFA l.o.}xf_2} - \alpha_{v_4}^{xf_2}]^+ \otimes [\beta_{v_5}^{\text{SFA l.o.}xf_2} - \alpha_{v_5}^{xf_2}]^+ \otimes [\beta_{v_6}^{\text{SFA l.o.}xf_2} - \alpha_{v_6}^{xf_2}]^+ \\
&= \beta_{v_3} \otimes \beta_{v_4} \otimes [(\beta_{v_5} - \alpha_{v_5}^{xxf_2}) - \alpha_{v_5}^{<f_0,f_1>})]^+ \otimes [\beta_{v_6}^{\text{SFA l.o.}xf_2} - (\alpha_{v_5}^{xf_2} \oslash \beta_{v_5}^{\text{SFA l.o.}xf_2})]^+ \\
&= \beta_{v_3} \otimes \beta_{v_4} \otimes [\beta_{v_5} - \alpha_{v_5}^{<f_0,f_1>}]^+ \otimes [\beta_{v_6} - (\alpha_{v_5}^{<f_0,f_1>} \oslash \beta_{v_5})]^+ \\
&= \beta_{v_3} \otimes \beta_{v_4} \otimes [\beta_{v_5} - (\alpha_{v_1}^{<f_0,f_1>} \oslash (\beta_{v_1} \otimes \beta_{v_2}))]^+ \otimes [\beta_{v_6} - ((\alpha_{v_1}^{<f_0,f_1>} \oslash (\beta_{v_1} \otimes \beta_{v_2})) \oslash \beta_{v_5})]^+ \\
&= \beta_{v_3} \otimes \beta_{v_4} \otimes [\beta_{v_5} - (((\alpha^{f_1} \oslash \beta_{v_0}) + \alpha^{f_0}) \oslash (\beta_{v_1} \otimes \beta_{v_2}))]^+ \otimes [\beta_{v_6} - ((((\alpha^{f_1} \oslash \beta_{v_0}) + \alpha^{f_0}) \oslash (\beta_{v_1} \otimes \beta_{v_2})) \oslash \beta_{v_5})]^+ \\
&= \beta_{20,20} \otimes \beta_{20,20} \otimes [\beta_{20,20} - (((\gamma_{5,25} \oslash \beta_{20,20}) + \gamma_{5,25}) \oslash (\beta_{20,20} \otimes \beta_{20,20}))]^+ \otimes [\beta_{20,20} - ((((\gamma_{5,25} \oslash \beta_{20,20}) + \gamma_{5,25}) \oslash (\beta_{20,20} \otimes \beta_{20,20})) \oslash \beta_{20,20})]^+ \\
&= \beta_{20,40} \otimes [\beta_{20,20} - (((\gamma_{5,25} \oslash \beta_{20,20}) + \gamma_{5,25}) \oslash \beta_{20,40})]^+ \otimes [\beta_{20,20} - ((((\gamma_{5,25} \oslash \beta_{20,20}) + \gamma_{5,25}) \oslash \beta_{20,40}) \oslash \beta_{20,20})]^+ \\
&= \beta_{20,40} \otimes [\beta_{20,20} - ((\gamma_{5,125} + \gamma_{5,25}) \oslash \beta_{20,40})]^+ \otimes [\beta_{20,20} - (((\gamma_{5,125} + \gamma_{5,25}) \oslash \beta_{20,40}) \oslash \beta_{20,20})]^+ \\
&= \beta_{20,40} \otimes [\beta_{20,20} - (\gamma_{10,150} \oslash \beta_{20,40})]^+ \otimes [\beta_{20,20} - ((\gamma_{10,150} \oslash \beta_{20,40}) \oslash \beta_{20,20})]^+ \\
&= \beta_{20,40} \otimes [\beta_{20,20} - \gamma_{10,550}]^+ \otimes [\beta_{20,20} - (\gamma_{10,550} \oslash \beta_{20,20})]^+ \\
&= \beta_{20,40} \otimes [\beta_{20,20} - \gamma_{10,550}]^+ \otimes [\beta_{20,20} - \gamma_{10,750}]^+ \\
&= \beta_{20,40} \otimes \beta_{10,47\frac{1}{2}} \otimes \beta_{10,55\frac{1}{2}} \\
&= \beta_{10,145}
\end{aligned}
$$

$$
\begin{aligned}
D^{f_1} &= \frac{R_{\text{e2e}}^{\text{l.o.}f_1} \cdot T_{\text{e2e}}^{\text{l.o.}f_1} + b^{f_1}}{R_{\text{e2e}}^{\text{l.o.}f_1}} \\
&= \frac{10 \cdot 145 + 25}{10} \\
&= 147\frac{1}{2}
\end{aligned}
$$

$$
\begin{aligned}
B^{f_1} &= \alpha^{f_1}(T_{\text{e2e}}^{\text{l.o.}f_1}) \\
&= 5 \cdot 145 + 25 \\
&= 750
\end{aligned}
$$

SFA ARB_MUX:

$$
\begin{aligned}
\beta_{\text{e2e}}^{\text{l.o.}f_2} &= [\beta_{v_3}^{\text{SFA l.o.}xf_2} - \alpha_{v_3}^{xf_2}]^+ \otimes [\beta_{v_4}^{\text{SFA l.o.}xf_2} - \alpha_{v_4}^{xf_2}]^+ \otimes [\beta_{v_5}^{\text{SFA l.o.}xf_2} - \alpha_{v_5}^{xf_2}]^+ \otimes [\beta_{v_6}^{\text{SFA l.o.}xf_2} - \alpha_{v_6}^{xf_2}]^+ \\
&= \beta_{v_3} \otimes \beta_{v_4} \otimes [(\beta_{v_5} - \alpha_{v_5}^{xxf_2}) - \alpha_{v_5}^{<f_0,f_1>})]^+ \otimes [\beta_{v_6}^{\text{SFA l.o.}xf_2} - (\alpha_{v_5}^{xf_2} \oslash \beta_{v_5}^{\text{SFA l.o.}xf_2})]^+ \\
&= \beta_{v_3} \otimes \beta_{v_4} \otimes [\beta_{v_5} - \alpha_{v_5}^{<f_0,f_1>}]^+ \otimes [\beta_{v_6} - (\alpha_{v_5}^{<f_0,f_1>} \oslash \beta_{v_5})]^+ \\
&= \beta_{v_3} \otimes \beta_{v_4} \otimes [\beta_{v_5} - (\alpha_{v_1}^{<f_0,f_1>} \oslash (\beta_{v_1} \otimes \beta_{v_2}))]^+ \otimes [\beta_{v_6} - ((\alpha_{v_1}^{<f_0,f_1>} \oslash (\beta_{v_1} \otimes \beta_{v_2})) \oslash \beta_{v_5})]^+ \\
&= \beta_{v_3} \otimes \beta_{v_4} \otimes [\beta_{v_5} - (((\alpha^{f_1} \oslash \beta_{v_0}) + \alpha^{f_0}) \oslash (\beta_{v_1} \otimes \beta_{v_2}))]^+ \otimes [\beta_{v_6} - ((((\alpha^{f_1} \oslash \beta_{v_0}) + \alpha^{f_0}) \oslash (\beta_{v_1} \otimes \beta_{v_2})) \oslash \beta_{v_5})]^+ \\
&= \beta_{20,20} \otimes \beta_{20,20} \otimes [\beta_{20,20} - (((\gamma_{5,25} \oslash \beta_{20,20}) + \gamma_{5,25}) \oslash (\beta_{20,20} \otimes \beta_{20,20}))]^+ \otimes [\beta_{20,20} - ((((\gamma_{5,25} \oslash \beta_{20,20}) + \gamma_{5,25}) \oslash (\beta_{20,20} \otimes \beta_{20,20})) \oslash \beta_{20,20})]^+ \\
&= \beta_{20,40} \otimes [\beta_{20,20} - (((\gamma_{5,25} \oslash \beta_{20,20}) + \gamma_{5,25}) \oslash \beta_{20,40})]^+ \otimes [\beta_{20,20} - ((((\gamma_{5,25} \oslash \beta_{20,20}) + \gamma_{5,25}) \oslash \beta_{20,40}) \oslash \beta_{20,20})]^+ \\
&= \beta_{20,40} \otimes [\beta_{20,20} - ((\gamma_{5,125} + \gamma_{5,25}) \oslash \beta_{20,40})]^+ \otimes [\beta_{20,20} - (((\gamma_{5,125} + \gamma_{5,25}) \oslash \beta_{20,40}) \oslash \beta_{20,20})]^+ \\
&= \beta_{20,40} \otimes [\beta_{20,20} - (\gamma_{10,150} \oslash \beta_{20,40})]^+ \otimes [\beta_{20,20} - ((\gamma_{10,150} \oslash \beta_{20,40}) \oslash \beta_{20,20})]^+ \\
&= \beta_{20,40} \otimes [\beta_{20,20} - \gamma_{10,550}]^+ \otimes [\beta_{20,20} - (\gamma_{10,550} \oslash \beta_{20,20})]^+ \\
&= \beta_{20,40} \otimes [\beta_{20,20} - \gamma_{10,550}]^+ \otimes [\beta_{20,20} - \gamma_{10,750}]^+ \\
&= \beta_{20,40} \otimes \beta_{10,95} \otimes \beta_{10,115} \\
&= \beta_{10,250}
\end{aligned}
$$

$$
\begin{aligned}
D^{f_1} &= \frac{R_{\text{e2e}}^{\text{l.o.}f_1} \cdot T_{\text{e2e}}^{\text{l.o.}f_1} + b^{f_1}}{R_{\text{e2e}}^{\text{l.o.}f_1}} \\
&= \frac{10 \cdot 250 + 25}{10} \\
&= 252\frac{1}{2}
\end{aligned}
$$

$$
\begin{aligned}
B^{f_1} &= \alpha^{f_1}(T_{\text{e2e}}^{\text{l.o.}f_1}) \\
&= 5 \cdot 250 + 25 \\
&= 1275
\end{aligned}
$$

PMOO:

$$
\begin{aligned}
\beta_{\mathrm{e2e}}^{\mathrm{l.o.}f_2} &= (\beta_{v_3} \otimes \beta_{v_4}) \otimes [(\beta_{v_5} \otimes \beta_{v_6}) - \alpha_{v_5}^{xf_2}]^+ \\
&= (\beta_{v_3} \otimes \beta_{v_4}) \otimes [(\beta_{v_5} \otimes \beta_{v_6}) - (((\alpha^{f_1} \oslash \beta_{v_0}) + \alpha^{f_0}) \oslash (\beta_{v_1} \otimes \beta_{v_2}))]^+ \\
&= (\beta_{20,20} \otimes \beta_{20,20}) \otimes [(\beta_{20,20} \otimes \beta_{20,20}) - (((\gamma_{5,25} \oslash \beta_{20,20}) + \gamma_{5,25}) \oslash (\beta_{20,20} \otimes \beta_{20,20}))]^+ \\
&= \beta_{20,40} \otimes [\beta_{20,40} - ((\gamma_{5,125} + \gamma_{5,25}) \oslash \beta_{20,40})]^+ \\
&= \beta_{20,40} \otimes [\beta_{20,40} - (\gamma_{10,150} \oslash \beta_{20,40})]^+ \\
&= \beta_{20,40} \otimes [\beta_{20,40} - \gamma_{10,550}]^+ \\
&= \beta_{20,40} \otimes \beta_{10,135} \\
&= \beta_{10,175}
\end{aligned}
$$

$$
\begin{aligned}
D^{f_1} &= \frac{R_{\mathrm{e2e}}^{\mathrm{l.o.}f_2} \cdot T_{\mathrm{e2e}}^{\mathrm{l.o.}f_2} + b^{f_2}}{R_{\mathrm{e2e}}^{\mathrm{l.o.}f_2}} \\
&= \frac{10 \cdot 175 + 25}{10} \\
&= \frac{1775}{10} \\
&= 177\frac{1}{2}
\end{aligned}
$$

$$
\begin{aligned}
B^{f_2} &= \alpha^{f_2}(T_{\mathrm{e2e}}^{\mathrm{l.o.}f_2}) \\
&= 5 \cdot 175 + 25 \\
&= 900
\end{aligned}
$$