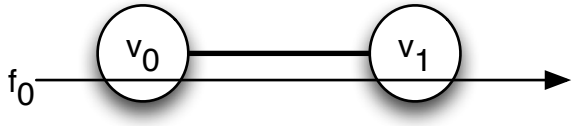
Tandem_1SC_1Flow.java



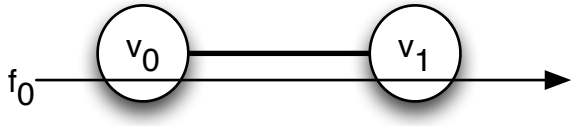
- $\beta_{v_0} = \beta_{v_1} = \beta_{R_{v_i},T_{v_i}} = \beta_{10,10},\ i \in \{0,1\}$
- $\alpha^{f_0} = \gamma_{r^{f_0},b^{f_0}} = \gamma_{5,25}$

TFA			FIFO_MUX	ARB_MUX
v_0	$\alpha^{\text{sum}}_{v_0}$		$= \gamma_{r^{\text{sum}}_{v_0},b^{\text{sum}}_{v0}} = \alpha^{f_0}$	
	$D^{f_0}_{v_0}$		$\beta_{v_0} = b^{\text{sum}}_{v_0}$ $10 \cdot [t-10]^+ = 25$ $t = 12.5$	$\beta_{v_0} = \alpha^{\text{sum}}_{v_0}$ $10 \cdot [t-10]^+ = 5 \cdot t + 25$ $t = 25$
	$B^{f_0}_{v_1}$		$\alpha^{\text{sum}}_{v_0}(T_{v_0}) = 5 \cdot 10 + 25$ $= 75$	
v_1	$\alpha^{\text{sum}}_{v_1} = (\alpha^{\text{sum}}_{v_0})^*$	$r_{\alpha^{\text{sum}}_{v_1}}$	$= r^{\text{sum}}_{v_0} = r^{f_0} = 5$	
		$b_{\alpha^{\text{sum}}_{v_1}}$	$\alpha^{\text{sum}}_{v_0}(T_{v_0}) = 75$	
		$=$	$= \gamma_{5,75}$	
	$D^{f_0}_{v_1}$		$\beta_{v_1} = b_{\alpha^{\text{sum}}_{v_1}}$ $10 \cdot [t-10]^+ = 75$ $t = 17.5$	$\beta_{v_1} = \alpha^{\text{sum}}_{v_1}$ $10 \cdot [t-10]^+ = 5 \cdot t + 75$ $t = 35$
	$B^{f_0}_{v_1}$		$\alpha^{\text{sum}}_{v_1}(T_{v_1}) = 5 \cdot 10 + 75$ $= 125$	
D^{f_0}			$\sum_{i=0}^{1} D^{f_0}_{v_i} = 30$	$\sum_{i=0}^{1} D^{f_0}_{v_i} = 60$
B^{f_0}			$\max_i b^{f_0}_{v_i} = 125$	

SFA			FIFO_MUX	ARB_MUX
v_0	crosstraffic $\alpha_{v_0}^{xf_0} = \gamma_{r_{v_0}^{xf_0}, b_{v_0}^{xf_0}}$	$r_{v_0}^{xf_0}$	0	
		$b_{v_0}^{xf_0}$	0	
		$=$	$= \gamma_{0,0}$	
	left over service $\beta_{v_0}^{\text{l.o.}f_0} = \beta_{R_{v_0}^{\text{l.o.}f_0}, T_{v_0}^{\text{l.o.}f_0}}$	$R_{v_0}^{\text{l.o.}f_0}$	$[R_{v_0} - r_{v_0}^{xf_0}]^+ = 10$	
		$T_{v_0}^{\text{l.o.}f_0}$	$\beta_{v_0} = b_{v_0}^{xf_0}$ $10 \cdot [t-10]^+ = 0$ $t = 10$	$\beta_{v_0} = \alpha_{v_0}^{xf_0}$ $10 \cdot [t-10]^+ = 0 \cdot t + 0$ $t = 10$
		$=$	$= \beta_{10,10} = \beta_{v_0}$	$= \beta_{10,10} = \beta_{v_0}$
	output of crosstraffic to same next node $\alpha_{v_0 v_1}^{xf_0} = \gamma_{r_{v_0 v_1}^{xf_0}, b_{v_0 v_1}^{xf_0}}$	$r_{v_0 v_1}^{xf_0}$	0	
		$b_{v_0 v_1}^{xf_0}$	0	
		$=$	$= \gamma_{0,0}$	
v_1	crosstraffic $\alpha_{v_1}^{xf_0} = \gamma_{r_{v_1}^{xf_0}, b_{v_1}^{xf_0}}$	$r_{v_1}^{xf_0}$	0	
		$b_{v_1}^{xf_0}$	0	
		$=$	$= \gamma_{0,0}$	
	left over service $\beta_{v_1}^{\text{l.o.}f_0} = \beta_{R_{v_1}^{\text{l.o.}f_0}, T_{v_1}^{\text{l.o.}f_0}}$	$R_{v_1}^{\text{l.o.}f_0}$	$[R_{v_1} - r_{v_1}^{xf_0}]^+ = 10$	
		$T_{v_1}^{\text{l.o.}f_0}$	$\beta_{v_1} = b_{v_1}^{xf_0}$ $t = 10$	$\beta_{v_1} = \alpha_{v_1}^{xf_0}$ $t = 10$
		$=$	$= \beta_{10,10} = \beta_{v_1}$	$= \beta_{10,10} = \beta_{v_1}$
	output of crosstraffic not needed			
$\beta_{\text{e2e}}^{\text{l.o.}f_0} = \beta_{R_{\text{e2e}}^{\text{l.o.}f_0}, T_{\text{e2e}}^{\text{l.o.}f_0}}$			$\bigotimes_{i=0}^{1} \beta_{v_i}^{\text{l.o.}f_0} = \beta_{10,20}$	
D^{f_0}			$\beta_{\text{e2e}}^{\text{l.o.}f_0} = b^{f_0}$ $10 \cdot [t-20]^+ = 25$ $t = 22.5$	
B^{f_0}			$\alpha^{f_0}(T_{\text{e2e}}^{\text{l.o.}f_0}) = 5 \cdot 20 + 25$ $= 125$	

PMOO		ARB_MUX
$\beta_{\text{e2e}} = \beta_{R_{\text{e2e}},T_{\text{e2e}}}$		$\bigotimes_{i=0}^{1} \beta_{v_i} = \beta_{10,20}$
crosstraffic $\alpha_{\text{e2e}}^{xf_0} = \gamma_{r_{\text{e2e}}^{xf_0},b_{\text{e2e}}^{xf_0}}$	$r_{\text{e2e}}^{xf_0}$	0
	$b_{\text{e2e}}^{xf_0}$	0
	$=$	$= \gamma_{0,0}$
left over service $\beta_{\text{e2e}}^{\text{l.o.}f_0} = \beta_{R_{\text{e2e}}^{\text{l.o.}f_0},T_{\text{e2e}}^{\text{l.o.}f_0}}$	$R_{\text{e2e}}^{\text{l.o.}f_0}$	$[R_{\text{e2e}} - r_{\text{e2e}}^{xf_0}]^+ = 10$
	$T_{\text{e2e}}^{\text{l.o.}f_0}$	$\beta_{\text{e2e}} = \alpha_{\text{e2e}}^{xf_0}$ $t = 20$
	$=$	$\beta_{10,20} = \beta_{\text{e2e}}$
D^{f_0}		$\beta_{\text{e2e}}^{\text{l.o.}f_0} = b^{f_0}$ $10 \cdot [t-20]^+ = 25$ $t = 22.5$
B^{f_0}		$\alpha^{f_0}(T_{\text{e2e}}^{\text{l.o.}f_0}) = 5 \cdot 20 + 25$ $= 125$

Tandem_2SCs_1Flow.java



- $\beta_{v_0} = \beta_{R_{v_0},T_{v_0}} = \beta_{10,10}$
- $\beta_{v_1} = \beta_{R_{v_1},T_{v_1}} = \beta_{6,6}$
- $\alpha^{f_0} = \gamma_{r^{f_0},b^{f_0}} = \gamma_{5,25}$

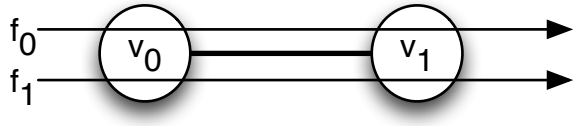
<table>
<tr><td colspan="2">TFA</td><td>FIFO_MUX</td><td>ARB_MUX</td></tr>
<tr><td rowspan="3">v_0</td><td>$\alpha_{v_0}^{\text{sum}}$</td><td colspan="2">$= \gamma_{r_{v_0}^{\text{sum}},b_{v0}^{\text{sum}}} = \alpha^{f_0}$</td></tr>
<tr><td>$D_{v_0}^{f_0}$</td><td>$\beta_{v_0} = b_{v_0}^{\text{sum}}$
$10 \cdot [t-10]^+ = 25$
$t = 12.5$</td><td>$\beta_{v_0} = \alpha_{v_0}^{\text{sum}}$
$10 \cdot [t-10]^+ = 5 \cdot t + 25$
$t = 25$</td></tr>
<tr><td>$B_{v_1}^{f_0}$</td><td colspan="2">$\alpha_{v_0}^{\text{sum}}(T_{v_0}) = 5 \cdot 10 + 25$
$= 75$</td></tr>
<tr><td rowspan="5">v_1</td><td rowspan="3">$\alpha_{v_1}^{\text{sum}} = (\alpha_{v_0}^{\text{sum}})^*$</td><td>$r_{\alpha_{v_1}^{\text{sum}}}$</td><td colspan="2">$= r_{v_0}^{\text{sum}} = r^{f_0} = 5$</td></tr>
<tr><td>$b_{\alpha_{v_1}^{\text{sum}}}$</td><td colspan="2">$\alpha_{v_0}^{\text{sum}}(T_{v_0}) = 75$</td></tr>
<tr><td>$=$</td><td colspan="2">$= \gamma_{5,75}$</td></tr>
<tr><td>$D_{v_1}^{f_0}$</td><td>$\beta_{v_1} = b_{\alpha_{v_1}^{\text{sum}}}$
$6 \cdot [t-6]^+ = 75$
$t = 18\frac{1}{2}$</td><td>$\beta_{v_1} = \alpha_{v_1}^{\text{sum}}$
$6 \cdot [t-6]^+ = 5 \cdot t + 75$
$t = 111$</td></tr>
<tr><td>$B_{v_1}^{f_0}$</td><td colspan="2">$\alpha_{v_1}^{\text{sum}}(T_{v_1}) = 5 \cdot 6 + 75$
$= 105$</td></tr>
<tr><td colspan="2">D^{f_0}</td><td>$\sum_{i=0}^{1} D_{v_i}^{f_0} = 31$</td><td>$\sum_{i=0}^{1} D_{v_i}^{f_0} = 136$</td></tr>
<tr><td colspan="2">B^{f_0}</td><td colspan="2">$\max_i b_{v_i}^{f_0} = 105$</td></tr>
</table>

SFA			FIFO_MUX	ARB_MUX
v_0	crosstraffic $\alpha_{v_0}^{xf_0} = \gamma_{r_{v_0}^{xf_0}, b_{v_0}^{xf_0}}$	$r_{v_0}^{xf_0}$	0	
		$b_{v_0}^{xf_0}$	0	
		$=$	$= \gamma_{0,0}$	
	left over service $\beta_{v_0}^{\text{l.o.}f_0} = \beta_{R_{v_0}^{\text{l.o.}f_0}, T_{v_0}^{\text{l.o.}f_0}}$	$R_{v_0}^{\text{l.o.}f_0}$	$[R_{v_0} - r_{v_0}^{xf_0}]^+ = 10$	
		$T_{v_0}^{\text{l.o.}f_0}$	$\beta_{v_0} = b_{v_0}^{xf_0}$ $10 \cdot [t-10]^+ = 0$ $t = 10$	$\beta_{v_0} = \alpha_{v_0}^{xf_0}$ $10 \cdot [t-10]^+ = 0 \cdot t + 0$ $t = 10$
		$=$	$= \beta_{10,10} = \beta_{v_0}$	
	output of crosstraffic to same next node $\alpha_{v_0 v_1}^{xf_0} = \gamma_{r_{v_0 v_1}^{xf_0}, b_{v_0 v_1}^{xf_0}}$	$r_{v_0 v_1}^{xf_0}$	0	
		$b_{v_0 v_1}^{xf_0} = B_{v_0}^{xf_0}$	0	
		$=$	$= \gamma_{0,0}$	
v_1	crosstraffic $\alpha_{v_1}^{xf_0} = \gamma_{r_{v_1}^{xf_0}, b_{v_1}^{xf_0}}$	$r_{v_1}^{xf_0}$	0	
		$b_{v_1}^{xf_0}$	0	
		$=$	$= \gamma_{0,0}$	
	left over service $\beta_{v_1}^{\text{l.o.}f_0} = \beta_{R_{v_1}^{\text{l.o.}f_0}, T_{v_1}^{\text{l.o.}f_0}}$	$R_{v_1}^{\text{l.o.}f_0}$	$[R_{v_1} - r_{v_1}^{xf_0}]^+ = 6$	
		$T_{v_1}^{\text{l.o.}f_0}$	$\beta_{v_1} = b_{v_1}^{xf_0}$ $6 \cdot [t-6]^+ = 0$ $t = 6$	$\beta_{v_1} = \alpha_{v_1}^{xf_0}$ $t = 6$
		$=$	$= \beta_{6,6} = \beta_{v_1}$	
	output of crosstraffic not needed			

$\beta_{\text{e2e}}^{\text{l.o.}f_0} = \beta_{R_{\text{e2e}}^{\text{l.o.}f_0}, T_{\text{e2e}}^{\text{l.o.}f_0}}$	$\bigotimes_{i=0}^{1} \beta_{v_i}^{\text{l.o.}f_0} = \beta_{6,16}$
D^{f_0}	$\beta_{\text{e2e}}^{\text{l.o.}f_0} = b^{f_0}$ $6 \cdot [t-16]^+ = 25$ $t = 20\frac{1}{6}$
B^{f_0}	$\alpha^{f_0}(T_{\text{e2e}}^{\text{l.o.}f_0}) = 5 \cdot 16 + 25$ $= 105$

PMOO		ARB_MUX
$\beta_{\mathrm{e2e}} = \beta_{R_{\mathrm{e2e}},T_{\mathrm{e2e}}}$		$\bigotimes_{i=0}^{1} \beta_{\upsilon_i} = \beta_{6,16}$
crosstraffic $\alpha_{\mathrm{e2e}}^{xf_0} = \gamma_{r_{\mathrm{e2e}}^{xf_0},b_{\mathrm{e2e}}^{xf_0}}$	$r_{\mathrm{e2e}}^{xf_0}$	0
	$b_{\mathrm{e2e}}^{xf_0}$	0
	$=$	$= \gamma_{0,0}$
left over service $\beta_{\mathrm{e2e}}^{\mathrm{l.o.}f_0} = \beta_{R_{\mathrm{e2e}}^{\mathrm{l.o.}f_0},T_{\mathrm{e2e}}^{\mathrm{l.o.}f_0}}$	$R_{\mathrm{e2e}}^{\mathrm{l.o.}f_0}$	$[R_{\mathrm{e2e}} - r_{\mathrm{e2e}}^{xf_0}]^+ = 6$
	$T_{\mathrm{e2e}}^{\mathrm{l.o.}f_0}$	$\beta_{\mathrm{e2e}} = \alpha_{\mathrm{e2e}}^{xf_0}$ $t = 16$
	$=$	$\beta_{6,16} = \beta_{\mathrm{e2e}}$
D^{f_0}		$\beta_{\mathrm{e2e}}^{\mathrm{l.o.}f_0} = b^{f_0}$ $6 \cdot [t-16]^+ = 25$ $t = 20\frac{1}{6}$
B^{f_0}		$\alpha^{f_0}(T_{\mathrm{e2e}}^{\mathrm{l.o.}f_0}) = 5 \cdot 16 + 25$ $= 105$

Tandem_1SC_2Flows_1AC_1Path.java



- $\beta_{v_0} = \beta_{v_1} = \beta_{R_{v_i},T_{v_i}} = \beta_{10,10}$, $i \in \{0,1\}$
- $\alpha^{f_0} = \alpha^{f_1} = \gamma_{r^{f_j},b^{f_j}} = \gamma_{5,25}$, $j \in \{0,1\}$

Flows f_0, f_1

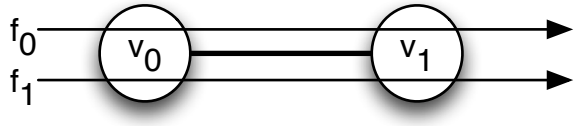
TFA results will be equal for all flows as they share the same path of servers.
SFA, PMOO results will be equal for all flows as they share the same path of servers and the same arrival curves.

TFA			FIFO_MUX	ARB_MUX
v_0	$\alpha^{\text{sum}}_{v_0} = \gamma^{\text{sum}} = \gamma_{r^{\text{sum}}_{v_0}, b^{\text{sum}}_{v0}}$		$\sum_{j=0}^{1} \alpha^{f_j} = \gamma_{10,50}$	
	$D^{f_0}_{v_0}$		$\begin{aligned} \beta_{v_0} &= b^{\text{sum}}_{v_0} \\ 10 \cdot [t-10]^+ &= 50 \\ t &= 15 \end{aligned}$	$\begin{aligned} \beta_{v_0} &= \alpha^{\text{sum}}_{v_0} \\ 10 \cdot [t-10]^+ &= 10 \cdot t + 50 \\ 0 \cdot t &= 150 \\ \Rightarrow & \quad D^{f_0}_{v_0} = \infty \end{aligned}$
	$B^{f_0}_{v_1}$		$\begin{aligned} \alpha^{\text{sum}}_{v_0}(T_{v_0}) &= 10 \cdot 10 + 50 \\ &= 150 \end{aligned}$	
v_1	$\alpha^{\text{sum}}_{v_1} = (\alpha^{\text{sum}}_{v_0})^*$	$r_{\alpha^{\text{sum}}_{v_1}}$	$= r^{\text{sum}}_{v_0} = 10$	
		$b_{\alpha^{\text{sum}}_{v_1}}$	$\alpha^{\text{sum}}_{v_0}(T_{v_0}) = 150$	
		$=$	$= \gamma_{10,150}$	
	$D^{f_0}_{v_1}$		$\begin{aligned} \beta_{v_1} &= b_{\alpha^{\text{sum}}_{v_1}} \\ 10 \cdot [t-10]^+ &= 150 \\ t &= 25 \end{aligned}$	$\begin{aligned} \beta_{v_1} &= \alpha^{\text{sum}}_{v_1} \\ 10 \cdot [t-10]^+ &= 10 \cdot t + 150 \\ 0 \cdot t &= 250 \\ \Rightarrow & \quad D^{f_0}_{v_1} = \infty \end{aligned}$
	$B^{f_0}_{v_1}$		$\begin{aligned} \alpha^{\text{sum}}_{v_1}(T_{v_1}) &= 10 \cdot 10 + 150 \\ &= 250 \end{aligned}$	
D^{f_0}			$\sum_{i=0}^{1} D^{f_0}_{v_i} = 40$	$\sum_{i=0}^{1} D^{f_0}_{v_i} = \infty$
B^{f_0}			$\max_i b^{f_0}_{v_i} = 250$	

SFA			FIFO_MUX	ARB_MUX
v_0	crosstraffic $\alpha_{v_0}^{xf_0} = \gamma_{r_{v_0}^{xf_0}, b_{v_0}^{xf_0}}$	$r_{v_0}^{xf_0}$	$r_{v_0}^{f_1} = r^{f_1} = 5$	
		$b_{v_0}^{xf_0}$	$b_{v_0}^{f_1} = b^{f_1} = 25$	
		$=$	$\gamma_{5,25} = \alpha^{f_1}$	
	left over service $\beta_{v_0}^{\text{l.o.}f_0} = \beta_{R_{v_0}^{\text{l.o.}f_0}, T_{v_0}^{\text{l.o.}f_0}}$	$R_{v_0}^{\text{l.o.}f_0}$	$[R_{v_0} - r_{v_0}^{xf_0}]^+ = 5$	
		$T_{v_0}^{\text{l.o.}f_0}$	$\beta_{v_0} = b_{v_0}^{xf_0}$ $10 \cdot [t-10]^+ = 25$ $t = 12.5$	$\beta_{v_0} = \alpha_{v_0}^{xf_0}$ $10 \cdot [t-10]^+ = 5 \cdot t + 25$ $t = 25$
		$=$	$= \beta_{5,12.5}$	$= \beta_{5,25}$
	output of crosstraffic to same next node $\alpha_{v_0 v_1}^{xf_0} = \gamma_{r_{v_0 v_1}^{xf_0}, b_{v_0 v_1}^{xf_0}}$	$r_{v_0 v_1}^{xf_0}$	$r_{v_0}^{f_1} = r^{f_1} = 5$	
		$b_{v_0 v_1}^{xf_0} = B_{v_0}^{xf_0}$	$\alpha_{v_0}^{xf_0}(T_{v_0}) = 5 \cdot 10 + 25$ $= 75$	
		$=$	$= \gamma_{5,75}$	
v_1	crosstraffic $\alpha_{v_1}^{xf_0} = \gamma_{r_{v_1}^{xf_0}, b_{v_1}^{xf_0}}$	$r_{v_1}^{xf_0}$	$= 5$	
		$b_{v_1}^{xf_0}$	$= 75$	
		$=$	$= \gamma_{5,75}$	
	left over service $\beta_{v_1}^{\text{l.o.}f_0} = \beta_{R_{v_1}^{\text{l.o.}f_0}, T_{v_1}^{\text{l.o.}f_0}}$	$R_{v_1}^{\text{l.o.}f_0}$	$[R_{v_1} - r_{v_1}^{xf_0}]^+ = 5$	
		$T_{v_1}^{\text{l.o.}f_0}$	$\beta_{v_1} = b_{v_1}^{xf_0}$ $10 \cdot [t-10]^+ = 75$ $t = 17.5$	$\beta_{v_1} = \alpha_{v_1}^{xf_0}$ $10 \cdot [t-10]^+ = 5 \cdot t + 75$ $t = 35$
		$=$	$= \beta_{5,17.5}$	$= \beta_{5,35}$
	output of crosstraffic not needed			
$\beta_{\text{e2e}}^{\text{l.o.}f_0} = \beta_{R_{\text{e2e}}^{\text{l.o.}f_0}, T_{\text{e2e}}^{\text{l.o.}f_0}}$			$\bigotimes_{i=0}^{1} \beta_{v_i}^{\text{l.o.}f_0} = \beta_{5,30}$	$\bigotimes_{i=0}^{1} \beta_{v_i}^{\text{l.o.}f_0} = \beta_{5,60}$
D^{f_0}			$\beta_{\text{e2e}}^{\text{l.o.}f_0} = b^{f_0}$ $5 \cdot [t-30]^+ = 25$ $t = 35$	$\beta_{\text{e2e}}^{\text{l.o.}f_0} = b^{f_0}$ $5 \cdot [t-60]^+ = 25$ $t = 65$
B^{f_0}			$\alpha^{f_0}(T_{\text{e2e}}^{\text{l.o.}f_0}) = 5 \cdot 30 + 25$ $= 175$	$\alpha^{f_0}(T_{\text{e2e}}^{\text{l.o.}f_0}) = 5 \cdot 60 + 25$ $= 325$

PMOO		ARB_MUX
$\beta_{\text{e2e}} = \beta_{R_{\text{e2e}},T_{\text{e2e}}}$		$\bigotimes_{i=0}^{1} \beta_{v_i} = \beta_{10,20}$
crosstraffic $\alpha_{\text{e2e}}^{xf_0} = \gamma_{r_{\text{e2e}}^{xf_0},b_{\text{e2e}}^{xf_0}}$	$r_{\text{e2e}}^{xf_0}$	$r_{v_0}^{f_1} = r^{f_1} = 5$
	$b_{\text{e2e}}^{xf_0}$	$b_{v_0}^{f_1} = b^{f_1} = 25$
	$=$	$= \gamma_{5,25}$
left over service $\beta_{\text{e2e}}^{\text{l.o.}f_0} = \beta_{R_{\text{e2e}}^{\text{l.o.}f_0},T_{\text{e2e}}^{\text{l.o.}f_0}}$	$R_{\text{e2e}}^{\text{l.o.}f_0}$	$[R_{\text{e2e}} - r_{\text{e2e}}^{xf_0}]^+ = 5$
	$T_{\text{e2e}}^{\text{l.o.}f_0}$	$\beta_{\text{e2e}} = \alpha_{\text{e2e}}^{xf_0}$ $10 \cdot [t-20]^+ = 5 \cdot t + 25$ $t = 45$
	$=$	$= \beta_{5,45}$
D^{f_0}		$\beta_{\text{e2e}}^{\text{l.o.}f_0} = b^{f_0}$ $5 \cdot [t-45]^+ = 25$ $t = 50$
B^{f_0}		$\alpha^{f_0}(T_{\text{e2e}}^{\text{l.o.}f_0}) = 5 \cdot 45 + 25$ $= 250$

Tandem_2SCs_2Flows_1AC_1Path.java



- $\beta_{v_0} = \beta_{R_{v_0},T_{v_0}} = \beta_{10,10}$
- $\beta_{v_1} = \beta_{R_{v_1},T_{v_1}} = \beta_{6,6}$
- $\alpha^{f_0} = \alpha^{f_1} = \gamma_{r^{f_j},b^{f_j}} = \gamma_{2.5,12.5},\ j \in \{0,1\}$

Flows f_0, f_1

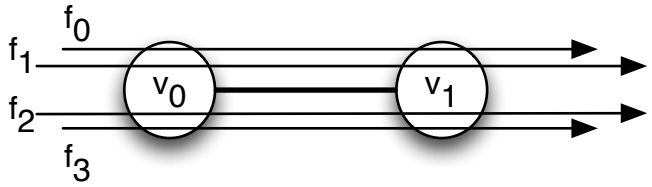
TFA results will be equal for all flows as they share the same path of servers.
SFA, PMOO results will be equal for all flows as they share the same path of servers and the same arrival curves.

TFA			FIFO_MUX	ARB_MUX
v_0	$\alpha^{\text{sum}}_{v_0} = \gamma^{\text{sum}} = \gamma_{r^{\text{sum}}_{v_0}, b^{\text{sum}}_{v0}}$		$\sum_{j=0}^{1} \alpha^{f_j} = \gamma_{5,25}$	
	$D^{f_0}_{v_0}$		$\beta_{v_0} = b^{\text{sum}}_{v_0}$ $10 \cdot [t-10]^+ = 25$ $t = 12.5$	$\beta_{v_0} = \alpha^{\text{sum}}_{v_0}$ $10 \cdot [t-10]^+ = 5 \cdot t + 25$ $t = 25$
	$B^{f_0}_{v_1}$		$\alpha^{\text{sum}}_{v_0}(T_{v_0}) = 5 \cdot 10 + 25$ $= 75$	
v_1	$\alpha^{\text{sum}}_{v_1} = (\alpha^{\text{sum}}_{v_0})^*$	$r_{\alpha^{\text{sum}}_{v_1}}$	$= r^{\text{sum}}_{v_0} = 5$	
		$b_{\alpha^{\text{sum}}_{v_1}}$	$\alpha^{\text{sum}}_{v_0}(T_{v_0}) = 75$	
		$=$	$= \gamma_{5,75}$	
	$D^{f_0}_{v_1}$		$\beta_{v_1} = b_{\alpha^{\text{sum}}_{v_1}}$ $6 \cdot [t-6]^+ = 75$ $t = 18\frac{1}{2}$	$\beta_{v_1} = \alpha^{\text{sum}}_{v_1}$ $6 \cdot [t-6]^+ = 5 \cdot t + 75$ $t = 111$
	$B^{f_0}_{v_1}$		$\alpha^{\text{sum}}_{v_1}(T_{v_1}) = 5 \cdot 6 + 75$ $= 105$	
D^{f_0}			$\sum_{i=0}^{1} D^{f_0}_{v_i} = 31$	$\sum_{i=0}^{1} D^{f_0}_{v_i} = 136$
$B^{f_0} = \max_i b^{f_0}_{v_i}$			$= 105$	

SFA			FIFO_MUX	ARB_MUX
v_0	crosstraffic $\alpha_{v_0}^{xf_0} = \gamma_{r_{v_0}^{xf_0}, b_{v_0}^{xf_0}}$	$r_{v_0}^{xf_0}$	$r_{v_0}^{f_1} = r^{f_1} = 2.5$	
		$b_{v_0}^{xf_0}$	$b_{v_0}^{f_1} = b^{f_1} = 12.5$	
		$=$	$= \gamma_{2.5,12.5} = \alpha^{f_1}$	
	left over service $\beta_{v_0}^{\text{l.o.}f_0} = \beta_{R_{v_0}^{\text{l.o.}f_0}, T_{v_0}^{\text{l.o.}f_0}}$	$R_{v_0}^{\text{l.o.}f_0}$	$[R_{v_0} - r_{v_0}^{xf_0}]^+ = 7.5$	
		$T_{v_0}^{\text{l.o.}f_0}$	$\beta_{v_0} = b_{v_0}^{xf_0}$ $10 \cdot [t-10]^+ = 12.5$ $t = 11.25$	$\beta_{v_0} = \alpha_{v_0}^{xf_0}$ $10 \cdot [t-10]^+ = 2.5 \cdot t + 12.5$ $t = 15$
		$=$	$= \beta_{7.5,11.25}$	$= \beta_{7.5,15}$
	output of crosstraffic to same next node $\alpha_{v_0 v_1}^{xf_0} = \gamma_{r_{v_0 v_1}^{xf_0}, b_{v_0 v_1}^{xf_0}}$	$r_{v_0 v_1}^{xf_0}$	$r_{v_0}^{f_1} = r^{f_1} = 2.5$	
		$b_{v_0 v_1}^{xf_0} = B_{v_0}^{xf_0}$	$\alpha_{v_0}^{xf_0}(T_{v_0}) = 2.5 \cdot 10 + 12.5$ $= 37.5$	
		$=$	$= \gamma_{2.5,37.5}$	
v_1	crosstraffic $\alpha_{v_1}^{xf_0} = \gamma_{r_{v_1}^{xf_0}, b_{v_1}^{xf_0}}$	$r_{v_1}^{xf_0}$	2.5	
		$b_{v_1}^{xf_0}$	37.5	
		$=$	$= \gamma_{2.5,37.5}$	
	left over service $\beta_{v_1}^{\text{l.o.}f_0} = \beta_{R_{v_1}^{\text{l.o.}f_0}, T_{v_1}^{\text{l.o.}f_0}}$	$R_{v_1}^{\text{l.o.}f_0}$	$[R_{v_1} - r_{v_1}^{xf_0}]^+ = 3.5$	
		$T_{v_1}^{\text{l.o.}f_0}$	$\beta_{v_1} = b_{v_1}^{xf_0}$ $6 \cdot [t-6]^+ = 37.5$ $t = 12.25$	$\beta_{v_1} = \alpha_{v_1}^{xf_0}$ $6 \cdot [t-6]^+ = 2.5 \cdot t + 37.5$ $t = 21$
		$=$	$= \beta_{3.5,12.25}$	$= \beta_{3.5,21}$
	output of crosstraffic not needed			
$\beta_{\text{e2e}}^{\text{l.o.}f_0} = \beta_{R_{\text{e2e}}^{\text{l.o.}f_0}, T_{\text{e2e}}^{\text{l.o.}f_0}}$			$\bigotimes_{i=0}^{1} \beta_{v_i}^{\text{l.o.}f_0} = \beta_{3.5,23.5}$	$\bigotimes_{i=0}^{1} \beta_{v_i}^{\text{l.o.}f_0} = \beta_{3.5,36}$
D^{f_0}			$\beta_{\text{e2e}}^{\text{l.o.}f_0} = b^{f_0}$ $3.5 \cdot [t-23.5]^+ = 12.5$ $t = 27\frac{1}{14}$	$\beta_{\text{e2e}}^{\text{l.o.}f_0} = b^{f_0}$ $3.5 \cdot [t-36]^+ = 12.5$ $t = 39\frac{4}{7}$
B^{f_0}			$\alpha^{f_0}(T_{\text{e2e}}^{\text{l.o.}f_0}) = 2.5 \cdot 23.5 + 12.5$ $= 71.25$	$\alpha^{f_0}(T_{\text{e2e}}^{\text{l.o.}f_0}) = 2.5 \cdot 36 + 12.5$ $= 102.5$

PMOO		ARB_MUX
$\beta_{\text{e2e}} = \beta_{R_{\text{e2e}},T_{\text{e2e}}}$		$\bigotimes_{i=0}^{1} \beta_{v_i} = \beta_{6,16}$
crosstraffic $\alpha_{\text{e2e}}^{xf_0} = \gamma_{r_{\text{e2e}}^{xf_0},b_{\text{e2e}}^{xf_0}}$	$r_{\text{e2e}}^{xf_0}$	$r_{v_0}^{f_1} = r^{f_1} = 2.5$
	$b_{\text{e2e}}^{xf_0}$	$b_{v_0}^{f_1} = b^{f_1} = 12.5$
	$=$	$= \gamma_{2.5,12.5}$
left over service $\beta_{\text{e2e}}^{\text{l.o.}f_0} = \beta_{R_{\text{e2e}}^{\text{l.o.}f_0},T_{\text{e2e}}^{\text{l.o.}f_0}}$	$R_{\text{e2e}}^{\text{l.o.}f_0}$	$[R_{\text{e2e}} - r_{\text{e2e}}^{xf_0}]^+ = 3.5$
	$T_{\text{e2e}}^{\text{l.o.}f_0}$	$\beta_{\text{e2e}} = \alpha_{\text{e2e}}^{xf_0}$ $6 \cdot [t-16]^+ = 2.5 \cdot t + 12.5$ $t = 31$
	$=$	$= \beta_{3.5,31}$
D^{f_0}		$\beta_{\text{e2e}}^{\text{l.o.}f_0} = b^{f_0}$ $3.5 \cdot [t-31]^+ = 12.5$ $t = 34\frac{4}{7}$
B^{f_0}		$\alpha^{f_0}(T_{\text{e2e}}^{\text{l.o.}f_0}) = 2.5 \cdot 31 + 12.5$ $= 90$

Tandem_1SCs_4Flows_1ACs_1Path.java



- $\beta_{v_0} = \beta_{v_1} = \beta_{R_{v_i},T_{v_i}} = \beta_{10,10}$, $i \in \{0, 1\}$
- $\alpha^{f_i} = \gamma_{r^{f_j},b^{f_j}} = \gamma_{2,10}$, $j \in \{0, 3\}$

Flows f_0, f_1, f_2, f_3

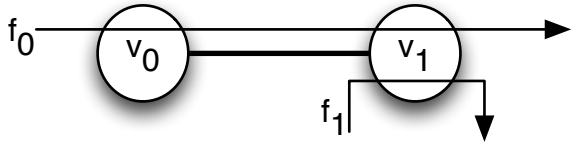
TFA results will be equal for all flows as they share the same path of servers.
SFA, PMOO results will be equal for all flows as they share the same path of servers and the same arrival curves.

TFA			FIFO_MUX	ARB_MUX
v_0	$\alpha^{\text{sum}}_{v_0} = \gamma^{\text{sum}} = \gamma_{r^{\text{sum}}_{v_0}, b^{\text{sum}}_{v_0}}$		$\sum_{j=0}^{3} \alpha^{f_j} = \gamma_{8,40}$	
	$D^{f_0}_{v_0}$		$\beta_{v_0} = b^{\text{sum}}_{v_0}$ $10 \cdot [t-10]^+ = 40$ $t = 14$	$\beta_{v_0} = \alpha^{\text{sum}}_{v_0}$ $10 \cdot [t-10]^+ = 8 \cdot t + 40$ $t = 70$
	$B^{f_0}_{v_1}$		$\alpha^{\text{sum}}_{v_0}(T_{v_0}) = 8 \cdot 10 + 40$ $= 120$	
v_1	$\alpha^{\text{sum}}_{v_1} = (\alpha^{\text{sum}}_{v_0})^*$	$r_{\alpha^{\text{sum}}_{v_1}}$	$= r^{\text{sum}}_{v_0} = 8$	
		$b_{\alpha^{\text{sum}}_{v_1}}$	$\alpha^{\text{sum}}_{v_0}(T_{v_0}) = 120$	
		$=$	$= \gamma_{8,120}$	
	$D^{f_j}_{v_1}$		$\beta_{v_1} = b_{\alpha^{\text{sum}}_{v_1}}$ $10 \cdot [t-10]^+ = 120$ $t = 22$	$\beta_{v_1} = \alpha^{\text{sum}}_{v_1}$ $10 \cdot [t-10]^+ = 8 \cdot t + 120$ $t = 110$
	$B^{f_j}_{v_1}$		$\alpha^{\text{sum}}_{v_1}(T_{v_1}) = 8 \cdot 10 + 120$ $= 200$	
D^{f_j}			$\sum_{i=0}^{1} D^{f_j}_{v_i} = 36$	$\sum_{i=0}^{1} D^{f_j}_{v_i} = 180$
$B^{f_j} = \max_i b^{f_j}_{v_i}$			$= 200$	

SFA			FIFO_MUX	ARB_MUX
v_0	crosstraffic $\alpha_{v_0}^{xf_j} = \gamma_{r_{v_0}^{xf_j}, b_{v_0}^{xf_j}}$	$r_{v_0}^{xf_j}$	$\sum_{j=0}^{2} r^{f_j} = 6$	
		$b_{v_0}^{xf_j}$	$\sum_{j=0}^{3} b^{f_j} = 30$	
		$=$	$\gamma_{6,30} = \sum_{j=0}^{3} \alpha^{f_j}$	
	left over service $\beta_{v_0}^{\text{l.o.}f_j} = \beta_{R_{v_0}^{\text{l.o.}f_j}, T_{v_0}^{\text{l.o.}f_j}}$	$R_{v_0}^{\text{l.o.}f_j}$	$[R_{v_0} - r_{v_0}^{xf_j}]^+ = 4$	
		$T_{v_0}^{\text{l.o.}f_j}$	$\beta_{v_0} = b_{v_0}^{xf_0}$ $10 \cdot [t-10]^+ = 30$ $t = 13$	$\beta_{v_0} = \alpha_{v_0}^{xf_j}$ $10 \cdot [t-10]^+ = 6 \cdot t + 30$ $t = 32.5$
		$=$	$= \beta_{4,13}$	$= \beta_{4,32.5}$
	output of crosstraffic to same next node $\alpha_{v_0 v_1}^{xf_j} = \gamma_{r_{v_0 v_1}^{xf_j}, b_{v_0 v_1}^{xf_j}}$	$r_{v_0 v_1}^{xf_j}$	$= r_{v_0}^{xf_j} = 6$	
		$b_{v_0 v_1}^{xf_j} = B_{v_0}^{xf_j}$	$\alpha_{v_0}^{xf_j}(T_{v_0}) = 6 \cdot 10 + 30$ $= 90$	
		$=$	$= \gamma_{6,90}$	
v_1	crosstraffic $\alpha_{v_1}^{xf_j} = \gamma_{r_{v_1}^{xf_j}, b_{v_1}^{xf_j}}$	$r_{v_1}^{xf_j}$	6	
		$b_{v_1}^{xf_0}$	90	
		$=$	$= \gamma_{6,90}$	
	left over service $\beta_{v_1}^{\text{l.o.}f_j} = \beta_{R_{v_1}^{\text{l.o.}f_j}, T_{v_1}^{\text{l.o.}f_j}}$	$R_{v_1}^{\text{l.o.}f_j}$	$[R_{v_1} - r_{v_1}^{xf_j}]^+ = 4$	
		$T_{v_1}^{\text{l.o.}f_j}$	$\beta_{v_1} = b_{v_1}^{xf_0}$ $10 \cdot [t-10]^+ = 90$ $t = 19$	$\beta_{v_1} = \alpha_{v_1}^{xf_j}$ $10 \cdot [t-10]^+ = 4 \cdot t + 90$ $t = 47.5$
		$=$	$= \beta_{4,19}$	$= \beta_{4,47.5}$
	output of crosstraffic not needed			
$\beta_{\text{e2e}}^{\text{l.o.}f_j} = \beta_{R_{\text{e2e}}^{\text{l.o.}f_j}, T_{\text{e2e}}^{\text{l.o.}f_j}}$			$\bigotimes_{i=0}^{1} \beta_{v_i}^{\text{l.o.}f_j} = \beta_{4,32}$	$\bigotimes_{i=0}^{1} \beta_{v_i}^{\text{l.o.}f_j} = \beta_{4,80}$
D^{f_j}			$\beta_{\text{e2e}}^{\text{l.o.}f_j} = b^{f_j}$ $4 \cdot [t-32]^+ = 10$ $t = 34.5$	$\beta_{\text{e2e}}^{\text{l.o.}f_j} = b^{f_j}$ $4 \cdot [t-80]^+ = 10$ $t = 82.5$
B^{f_j}			$\alpha^{f_j}(T_{\text{e2e}}^{\text{l.o.}f_j}) = 2 \cdot 32 + 10$ $= 74$	$\alpha^{f_j}(T_{\text{e2e}}^{\text{l.o.}f_j}) = 2 \cdot 80 + 10$ $= 170$

PMOO		ARB_MUX
$\beta_{\text{e2e}} = \beta_{R_{\text{e2e}},T_{\text{e2e}}}$		$\bigotimes_{i=0}^{1} \beta_{v_i} = \beta_{10,20}$
crosstraffic $\alpha_{\text{e2e}}^{xf_j} = \gamma_{r_{\text{e2e}}^{xf_j},b_{\text{e2e}}^{xf_j}}$	$r_{\text{e2e}}^{xf_j}$	$\sum_{j=0}^{2} r^{f_j} = 6$
	$b_{\text{e2e}}^{xf_j}$	$\sum_{j=0}^{3} b^{f_j} = 30$
	$=$	$= \gamma_{6,30}$
left over service $\beta_{\text{e2e}}^{\text{l.o.}f_j} = \beta_{R_{\text{e2e}}^{\text{l.o.}f_j},T_{\text{e2e}}^{\text{l.o.}f_j}}$	$R_{\text{e2e}}^{\text{l.o.}f_j}$	$[R_{\text{e2e}} - r_{\text{e2e}}^{xf_j}]^+ = 4$
	$T_{\text{e2e}}^{\text{l.o.}f_j}$	$\beta_{\text{e2e}} = \alpha_{\text{e2e}}^{xf_j}$ $10 \cdot [t-20]^+ = 6 \cdot t + 30$ $t = 57.5$
	$=$	$= \beta_{4,57.5}$
D^{f_j}		$\beta_{\text{e2e}}^{\text{l.o.}f_j} = b^{f_j}$ $4 \cdot [t-57.5]^+ = 10$ $t = 60$
B^{f_j}		$\alpha^{f_j}(T_{\text{e2e}}^{\text{l.o.}f_j}) = 2 \cdot 57.5 + 10$ $= 125$

Tandem_1SC_2Flows_1AC_2Paths.java



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

Flow f_0

TFA			FIFO_MUX	ARB_MUX
v_0	$\alpha^{\text{sum}}_{v_0}$		$= \gamma_{r^{\text{sum}}_{v_0}, b^{\text{sum}}_{v0}} = \alpha^{f_0}$	
	$D^{f_0}_{v_0}$		$\beta_{v_0} = b^{\text{sum}}_{v_0}$ $20 \cdot [t-20]^+ = 25$ $t = 21.25$	$\beta_{v_0} = \alpha^{\text{sum}}_{v_0}$ $20 \cdot [t-20]^+ = 5 \cdot t + 25$ $15 \cdot t = 425$ $t = 28\frac{1}{3}$
	$B^{f_0}_{v_1}$		$\alpha^{\text{sum}}_{v_0}(T_{v_0}) = 5 \cdot 20 + 25$ $= 125$	
v_1	$\alpha^{\text{sum}}_{v_1} = (\alpha^{f_0}_{v_0})^* + \alpha^{f_1}$	$r_{\alpha^{\text{sum}}_{v_1}}$	$= 10$	
		$b_{\alpha^{\text{sum}}_{v_1}}$	$\alpha^{f_0}_{v_0}(T_{v_0}) + b^{f_1} = 125 + 25 = 150$	
		$=$	$= \gamma_{10,150}$	
	$D^{f_0}_{v_1}$		$\beta_{v_1} = b_{\alpha^{\text{sum}}_{v_1}}$ $20 \cdot [t-20]^+ = 150$ $t = 27.5$	$\beta_{v_1} = \alpha^{\text{sum}}_{v_1}$ $20 \cdot [t-20]^+ = 10 \cdot t + 150$ $t = 55$
	$B^{f_0}_{v_1}$		$\alpha^{\text{sum}}_{v_1}(T_{v_1}) = 10 \cdot 20 + 150$ $= 350$	
D^{f_0}			$\sum_{i=0}^{1} D^{f_0}_{v_i} = 48.75$	$\sum_{i=0}^{1} D^{f_0}_{v_i} = 83\frac{1}{3}$
B^{f_0}			$\max_i b^{f_0}_{v_i} = 350$	

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

SFA, PMOO			ARB_MUX
v_0	crosstraffic $\alpha_{v_0}^{xf_0} = \gamma_{r_{v_0}^{xf_0}, b_{v_0}^{xf_0}}$	$r_{v_0}^{xf_0}$	$= 0$
		$b_{v_0}^{xf_0}$	$= 0$
		$=$	$= \gamma_{0,0}$
	left over service $\beta_{v_0}^{\text{l.o.}f_0} = \beta_{R_{v_0}^{\text{l.o.}f_0}, T_{v_0}^{\text{l.o.}f_0}}$	$R_{v_0}^{\text{l.o.}f_0}$	$= 20$
		$T_{v_0}^{\text{l.o.}f_0}$	$= 20$
		$=$	$= \beta_{20,20}$
	output of crosstraffic to same next node $\alpha_{v_0v_1}^{xf_0} = \gamma_{r_{v_0v_1}^{xf_0}, b_{v_0v_1}^{xf_0}}$	$r_{v_0v_1}^{xf_0}$	$= 0$
		$b_{v_0v_1}^{xf_0} = B_{v_0}^{xf_0}$	$= 0$
		$=$	$= \gamma_{0,0}$
v_1	crosstraffic $\alpha_{v_1}^{xf_0} = \gamma_{r_{v_1}^{xf_0}, b_{v_1}^{xf_0}}$	$r_{v_1}^{xf_0}$	$= 5$
		$b_{v_1}^{xf_0}$	$= 25$
		$=$	$= \gamma_{5,25}$
	left over service $\beta_{v_1}^{\text{l.o.}f_0} = \beta_{R_{v_1}^{\text{l.o.}f_0}, T_{v_1}^{\text{l.o.}f_0}}$	$R_{v_1}^{\text{l.o.}f_0}$	$[R_{v_1} - r_{v_1}^{xf_0}]^+ = 15$
		$T_{v_1}^{\text{l.o.}f_0}$	$\beta_{v_1} = \alpha_{v_1}^{xf_0}$ $20 \cdot [t-20]^+ = 5 \cdot t + 25$ $t = 28\frac{1}{3}$
		$=$	$= \beta_{15,28\frac{1}{3}}$
	output of crosstraffic not needed		
$\beta_{\text{e2e}}^{\text{l.o.}f_0} = \beta_{R_{\text{e2e}}^{\text{l.o.}f_0}, T_{\text{e2e}}^{\text{l.o.}f_0}}$			$\bigotimes_{i=0}^{1} \beta_{v_i}^{\text{l.o.}f_0} = \beta_{15,48\frac{1}{3}}$
D^{f_0}			$\beta_{\text{e2e}}^{\text{l.o.}f_0} = b^{f_0}$ $15 \cdot [t - 48\frac{1}{3}]^+ = 25$ $t = 50$
B^{f_0}			$\alpha^{f_0}(T_{\text{e2e}}^{\text{l.o.}f_0}) = 5 \cdot 48\frac{1}{3} + 25$ $= 266\frac{2}{3}$

Flow f_1

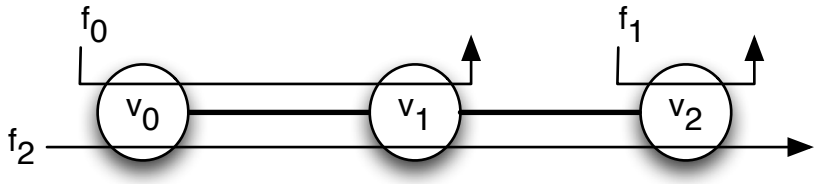
TFA			FIFO_MUX	ARB_MUX
v_1	$\alpha^{\text{sum}}_{v_1} = (\alpha^{f_0}_{v_0})^* + \alpha^{f_1}$	$r_{\alpha^{\text{sum}}_{v_1}}$	$= 10$	
		$b_{\alpha^{\text{sum}}_{v_1}}$	$\alpha^{f_0}_{v_0}(T_{v_0}) + b^{f_1} = 125 + 25 = 150$	
		$=$	$= \gamma_{10,150}$	
	$D^{f_1}_{v_1}$		$\beta_{v_1} = b_{\alpha^{\text{sum}}_{v_1}}$ $20 \cdot [t-20]^+ = 150$ $t = 27.5$	$\beta_{v_1} = \alpha^{\text{sum}}_{v_1}$ $20 \cdot [t-20]^+ = 10 \cdot t + 150$ $t = 55$
	$B^{f_1}_{v_1}$		$\alpha^{\text{sum}}_{v_1}(T_{v_1}) = 10 \cdot 20 + 150$ $= 350$	
D^{f_1}			$\sum_{i=0}^{1} D^{f_1}_{v_i} = 27.5$	$\sum_{i=0}^{1} D^{f_1}_{v_i} = 55$
B^{f_1}			$\max_i b^{f_0}_{v_i} = 350$	

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

SFA, PMOO			ARB_MUX
v_0	output of crosstraffic	$r^{xf_1}_{v_0v_1}$	$r^{f_0}_{v_0} = r^{f_0} = 5$
	to same next node	$b^{xf_1}_{v_0v_1} = B^{xf_1}_{v_0}$	$\alpha^{xf_1}_{v_0}(T_{v_0}) = 5 \cdot 20 + 25$
			$= 125$
	$\alpha^{xf_1}_{v_0v_1} = \gamma_{r^{xf_1}_{v_0v_1}, b^{xf_1}_{v_0v_1}}$	$=$	$= \gamma_{5,125}$
v_1	crosstraffic	$r^{xf_1}_{v_1}$	$= 5$
	$\alpha^{xf_1}_{v_1} = \gamma_{r^{xf_1}_{v_1}, b^{xf_1}_{v_1}}$	$b^{xf_1}_{v_1}$	$= 125$
		$=$	$= \gamma_{5,125}$
	left over service	$R^{\text{l.o.}f_1}_{v_1}$	$[R_{v_1} - r^{xf_1}_{v_1}]^+ = 15$
	$\beta^{\text{l.o.}f_1}_{v_1} = \beta_{R^{\text{l.o.}f_1}_{v_1}, T^{\text{l.o.}f_1}_{v_1}}$	$T^{\text{l.o.}f_1}_{v_1}$	$\beta_{v_1} = \alpha^{xf_1}_{v_1}$
			$20 \cdot [t-20]^+ = 5 \cdot t + 125$
			$t = 35$
		$=$	$= \beta_{15,35}$
	output of crosstraffic not needed		

$\beta^{\text{l.o.}f_1}_{\text{e2e}} = \beta_{R^{\text{l.o.}f_1}_{\text{e2e}}, T^{\text{l.o.}f_1}_{\text{e2e}}}$	$\bigotimes_{i=0}^{1} \beta^{\text{l.o.}f_1}_{v_i} = \beta_{15,35}$
D^{f_1}	$\beta^{\text{l.o.}f_1}_{\text{e2e}} = b^{f_1}$
	$15 \cdot [t-35]^+ = 25$
	$t = 36\frac{2}{3}$
B^{f_1}	$\alpha^{f_1}(T^{\text{l.o.}f_1}_{\text{e2e}}) = 5 \cdot 35 + 25$
	$= 200$

Tandem_1SC_3Flows_1AC_3Paths.java



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

Flow f_0 (comparable to Tandem_1SC_2Flows_1AC_1Path)

TFA			FIFO_MUX	ARB_MUX
v_0	$\alpha^{\text{sum}}_{v_0} = \gamma^{\text{sum}} = \gamma_{r^{\text{sum}}_{v_0}, b^{\text{sum}}_{v_0}}$		$\sum_{j=0}^{1} \alpha^{f_j} = \gamma_{10,50}$	
	$D^{f_0}_{v_0}$		$\beta_{v_0} = b^{\text{sum}}_{v_0}$ $20 \cdot [t-20]^+ = 50$ $t = 22.5$	$\beta_{v_0} = \alpha^{\text{sum}}_{v_0}$ $20 \cdot [t-20]^+ = 10 \cdot t + 50$ $t = 45$
	$B^{f_0}_{v_1}$		$\alpha^{\text{sum}}_{v_0}(T_{v_0}) = 20 \cdot 10 + 50$ $= 250$	
v_1	$\alpha^{\text{sum}}_{v_1} = (\alpha^{\text{sum}}_{v_0})^*$	$r_{\alpha^{\text{sum}}_{v_1}}$	$= r^{\text{sum}}_{v_0} = 10$	
		$b_{\alpha^{\text{sum}}_{v_1}}$	$\alpha^{\text{sum}}_{v_0}(T_{v_0}) = 10 \cdot 20 + 50 = 250$	
		$=$	$= \gamma_{10,250}$	
	$D^{f_0}_{v_1}$		$\beta_{v_1} = b_{\alpha^{\text{sum}}_{v_1}}$ $20 \cdot [t-20]^+ = 250$ $t = 32.5$	$\beta_{v_1} = \alpha^{\text{sum}}_{v_1}$ $20 \cdot [t-20]^+ = 10 \cdot t + 250$ $t = 65$
	$B^{f_0}_{v_1}$		$\alpha^{\text{sum}}_{v_1}(T_{v_1}) = 10 \cdot 20 + 250$ $= 450$	
D^{f_0}			$\sum_{i=0}^{1} D^{f_0}_{v_i} = 55$	$\sum_{i=0}^{1} D^{f_0}_{v_i} = 110$
B^{f_0}			$\max_i b^{f_0}_{v_i} = 450$	

SFA			FIFO_MUX	ARB_MUX
v_0	crosstraffic $\alpha_{v_0}^{xf_0} = \gamma_{r_{v_0}^{xf_0}, b_{v_0}^{xf_0}}$	$r_{v_0}^{xf_0}$	$r_{v_0}^{f_1} = r^{f_1} = 5$	
		$b_{v_0}^{xf_0}$	$b_{v_0}^{f_1} = b^{f_1} = 25$	
		$=$	$\gamma_{5,25} = \alpha^{f_1}$	
	left over service $\beta_{v_0}^{\text{l.o.}f_0} = \beta_{R_{v_0}^{\text{l.o.}f_0}, T_{v_0}^{\text{l.o.}f_0}}$	$R_{v_0}^{\text{l.o.}f_0}$	$[R_{v_0} - r_{v_0}^{xf_0}]^+ = 5$	
		$T_{v_0}^{\text{l.o.}f_0}$	$\beta_{v_0} = b_{v_0}^{xf_0}$ $20 \cdot [t-20]^+ = 25$ $t = 21.25$	$\beta_{v_0} = \alpha_{v_0}^{xf_0}$ $20 \cdot [t-20]^+ = 5 \cdot t + 25$ $t = 28\frac{1}{3}$
		$=$	$= \beta_{15,21.25}$	$= \beta_{15,28\frac{1}{3}}$
	output of crosstraffic to same next node $\alpha_{v_0v_1}^{xf_0} = \gamma_{r_{v_0v_1}^{xf_0}, b_{v_0v_1}^{xf_0}}$	$r_{v_0v_1}^{xf_0}$	$r_{v_0}^{f_1} = r^{f_1} = 5$	
		$b_{v_0v_1}^{xf_0} = B_{v_0}^{xf_0}$	$\alpha_{v_0}^{xf_0}(T_{v_0}) = 5 \cdot 20 + 25$ $= 125$	
		$=$	$= \gamma_{5,125}$	
v_1	crosstraffic $\alpha_{v_1}^{xf_0} = \gamma_{r_{v_1}^{xf_0}, b_{v_1}^{xf_0}}$	$r_{v_1}^{xf_0}$	$= 5$	
		$b_{v_1}^{xf_0}$	$= 125$	
		$=$	$= \gamma_{5,125}$	
	left over service $\beta_{v_1}^{\text{l.o.}f_0} = \beta_{R_{v_1}^{\text{l.o.}f_0}, T_{v_1}^{\text{l.o.}f_0}}$	$R_{v_1}^{\text{l.o.}f_0}$	$[R_{v_1} - r_{v_1}^{xf_0}]^+ = 15$	
		$T_{v_1}^{\text{l.o.}f_0}$	$\beta_{v_1} = b_{v_1}^{xf_0}$ $20 \cdot [t-20]^+ = 125$ $t = 26.25$	$\beta_{v_1} = \alpha_{v_1}^{xf_0}$ $20 \cdot [t-20]^+ = 5 \cdot t + 125$ $t = 35$
		$=$	$= \beta_{15,26.25}$	$= \beta_{15,35}$
	output of crosstraffic not needed			
$\beta_{\text{e2e}}^{\text{l.o.}f_0} = \beta_{R_{\text{e2e}}^{\text{l.o.}f_0}, T_{\text{e2e}}^{\text{l.o.}f_0}}$			$\bigotimes_{i=0}^{1} \beta_{v_i}^{\text{l.o.}f_0} = \beta_{15,47.5}$	$\bigotimes_{i=0}^{1} \beta_{v_i}^{\text{l.o.}f_0} = \beta_{15,63\frac{1}{3}}$
D^{f_0}			$\beta_{\text{e2e}}^{\text{l.o.}f_0} = b^{f_0}$ $15 \cdot [t-47.5]^+ = 25$ $t = 49\frac{1}{6}$	$\beta_{\text{e2e}}^{\text{l.o.}f_0} = b^{f_0}$ $15 \cdot [t-63\frac{1}{3}]^+ = 25$ $t = 65$
B^{f_0}			$\alpha^{f_0}(T_{\text{e2e}}^{\text{l.o.}f_0}) = 5 \cdot 47.5 + 25$ $= 262.5$	$\alpha^{f_0}(T_{\text{e2e}}^{\text{l.o.}f_0}) = 5 \cdot 63\frac{1}{3} + 25$ $= 341\frac{2}{3}$

PMOO		ARB_MUX
$\beta_{\text{e2e}} = \beta_{R_{\text{e2e}},T_{\text{e2e}}}$		$\bigotimes_{i=0}^{1} \beta_{v_i} = \beta_{20,40}$
crosstraffic $\alpha_{\text{e2e}}^{xf_0} = \gamma_{r_{\text{e2e}}^{xf_0},b_{\text{e2e}}^{xf_0}}$	$r_{\text{e2e}}^{xf_0}$	$r_{v_0}^{f_1} = r^{f_1} = 5$
	$b_{\text{e2e}}^{xf_0}$	$b_{v_0}^{f_1} = b^{f_1} = 25$
	$=$	$= \gamma_{5,25}$
left over service $\beta_{\text{e2e}}^{\text{l.o.}f_0} = \beta_{R_{\text{e2e}}^{\text{l.o.}f_0},T_{\text{e2e}}^{\text{l.o.}f_0}}$	$R_{\text{e2e}}^{\text{l.o.}f_0}$	$[R_{\text{e2e}} - r_{\text{e2e}}^{xf_0}]^+ = 15$
	$T_{\text{e2e}}^{\text{l.o.}f_0}$	$\beta_{\text{e2e}} = \alpha_{\text{e2e}}^{xf_0}$ $20 \cdot [t-40]^+ = 5 \cdot t + 25$ $t = 55$
	$=$	$= \beta_{15,55}$
D^{f_0}		$\beta_{\text{e2e}}^{\text{l.o.}f_0} = b^{f_0}$ $15 \cdot [t-55]^+ = 25$ $t = 56\frac{2}{3}$
B^{f_0}		$\alpha^{f_0}(T_{\text{e2e}}^{\text{l.o.}f_0}) = 5 \cdot 55 + 25$ $= 300$

Flow f_1 (comparable with Node_2Flows_2ACs)

The crossflow's arrival curve is the sum of the result of ComputeOutputBound(v_1, f_2) (see SFA below) and α^{f_1}.

TFA	FIFO_MUX	ARB_MUX
$\alpha^{\text{sum}} = \alpha^{f_2}_{v_1 v_2} + \alpha^{f_1} = \gamma_{r^{\text{sum}}, b^{\text{sum}}}$	$\gamma_{5,264\frac{1}{16}} + \gamma_{5,25} = \gamma_{10,289\frac{1}{16}}$	$\gamma_{5,355\frac{5}{9}} + \gamma_{5,25} = \gamma_{10,380\frac{5}{9}}$
D^{f_1}	$\begin{aligned} \beta_{v_0} &= b^{\text{sum}} \\ 20 \cdot [t-20]^+ &= 289\frac{1}{16} \\ t &= 34\frac{29}{64} \end{aligned}$	$\begin{aligned} \beta_{v_0} &= \alpha^{\text{sum}} \\ 20 \cdot [t-20]^+ &= 10 \cdot t + 380\frac{5}{9} \\ t &= 78\frac{5}{90} \end{aligned}$
B^{f_1}	$\begin{aligned} \alpha^{\text{sum}}(T_{v_0}) &= 10 \cdot 20 + 289\frac{1}{16} \\ &= 489\frac{1}{16} \end{aligned}$	$\begin{aligned} \alpha^{\text{sum}}(T_{v_0}) &= 10 \cdot 20 + 380\frac{5}{9} \\ &= 580\frac{5}{9} \end{aligned}$

Current ComputeOutputBpund(v_1, f_2)-version calculating $\alpha^{f_2}_{v_1v_2}$ example:

$$\begin{aligned}
\alpha^{f_2}_{v_1v_2} &= \alpha^{f_2}_{v_0v_1} \oslash \beta^{\text{l.o.}f_2}_{v1} \otimes \\
\text{(for ARB_MUX)} &= \alpha^{f_2}_{v_0v_1} \oslash [\beta_{v_1} - \alpha^{f_0}_{v_0v_1}]^+ \\
&= \alpha^{f_2}_{v_0v_1} \oslash [\beta_{v_1} - (\alpha^{f_0} \oslash \beta^{\text{l.o.}f_0}_{v_0})]^+ \\
&= \alpha^{f_2}_{v_0v_1} \oslash [\beta_{v_1} - (\alpha^{f_0} \oslash [\beta_{v_0} - \alpha^{f_2}]^+)]^+
\end{aligned}$$

SFA		FIFO_MUX	ARB_MUX
$\beta_{v_0}^{\text{l.o.}f_0} = \beta_{v_0}^{\text{l.o.}f_2} = \beta_{R_{v_0}^{\text{l.o.}}, T_{v_0}^{\text{l.o.}}}$	$R_{v_0}^{\text{l.o.}}$	$= R_{v_0} - r^{f_0} = R_{v_0} - r^{f_2} = 15$	
	$T_{v_0}^{\text{l.o.}}$	$\beta_{v_0} = b_{v_0}^{f_{\{0,2\}}}$ $20 \cdot [t-20]^+ = 25$ $t = 21.25$	$\beta_{v_0} = \alpha_{v_0}^{f_{\{0,2\}}}$ $20 \cdot [t-20]^+ = 5 \cdot t + 25$ $t = 28\frac{1}{3}$
	$=$	$= \beta_{15,21.25}$	$= \beta_{15,28\frac{1}{3}}$
$\alpha_{v_0v_1}^{f_{\{0.2\}}} = \alpha^{f_0} \oslash \beta_{v_0}^{\text{l.o.}f_0} = \gamma_{r_{v_0v_1}, b_{v_0v_1}}$	$r_{v_0v_1}$	$= r^{f_0} = 5$	
	$b_{v_0v_1}$	$\alpha^{f_0}(T_{v_0}^{\text{l.o.}}) = 131.25$	$\alpha^{f_0}(T_{v_0}^{\text{l.o.}}) = 166\frac{2}{3}$
	$=$	$= \gamma_{5,131.25}$	$= \gamma_{5,166\frac{2}{3}}$
$\beta_{v_1}^{\text{l.o.}f_2} = [\beta_{v_1} - \alpha_{v_0v_1}^{f_0}]^+ = \beta_{R_{v_1}^{\text{l.o.}f_2}, T_{v_1}^{\text{l.o.}f_2}}$	$R_{v_1}^{\text{l.o.}f_2}$	$= [\, R_{v_1} - r^{xf_2}]^+ = [R_{v_1} - r_{v_0v_1}^{f_0}]^+ = 15$	
	$T_{v_1}^{\text{l.o.}f_2}$	$\beta_{v_1} = b_{v_0v_1}^{f_0}$ $20 \cdot [t-20]^+ = 131.25$ $t = 26\frac{9}{16}$	$\beta_{v_1} = \alpha_{v_0v_1}^{f_0}$ $20 \cdot [t-20]^+ = 5 \cdot t + 166\frac{2}{3}$ $t = 37\frac{7}{9}$
	$=$	$=\beta_{15,26\frac{9}{16}}$	$=\beta_{15,37\frac{7}{9}}$
$\alpha_{v_1v_2}^{f_2} = \alpha_{v_0,v_1}^{f_2} \oslash \beta_{v_1}^{\text{l.o.}f_2} = \gamma_{r_{v_1v_2}, b_{v_1v_2}}$	$r_{v_1v_2}$	$= r_{v_0v_1}^{f_2} = 5$	
	$b_{v_1v_2}$	$\alpha_{v_0,v_1}^{f_2}(T_{v_1}^{\text{l.o.}f_2}) = 264\frac{1}{16}$	$\alpha_{v_0,v_1}^{f_2}(T_{v_1}^{\text{l.o.}f_2}) = 355\frac{5}{9}$
	$=$	$= \gamma_{5,264\frac{1}{16}}$	$= \gamma_{5,355\frac{5}{9}}$
$\beta_{v_2}^{\text{l.o.}f_1} = [\beta_{v_2} - \alpha_{v_1v_2}^{f_2}]^+ = \beta_{R_{v_2}^{\text{l.o.}f_1}, T_{v_2}^{\text{l.o.}f_1}}$	$R_{v_2}^{\text{l.o.}f_1}$	$= R_{v_2} - r_{v_1v_2}^{f_2} = 15$	
	$T_{v_2}^{\text{l.o.}f_1}$	$\beta_{v_1} = b_{v_1v_2}^{f_2}$ $20 \cdot [t-20]^+ = 264\frac{1}{16}$ $t = 33\frac{13}{64}$	$\beta_{v_1} = \alpha_{v_1v_2}^{f_2}$ $20 \cdot [t-20]^+ = 5 \cdot t + 355\frac{5}{9}$ $t = 50\frac{10}{27}$
	$=$	$=\beta_{15,33\frac{13}{64}}$	$=\beta_{15,50\frac{10}{27}}$
D^{f_1}		$\beta_{v_2}^{\text{l.o.}f_1} = b^{f_1}$ $15 \cdot [t-33\frac{13}{64}]^+ = 25$ $t = 34\frac{167}{192}$	$\beta_{v_2}^{\text{l.o.}f_1} = b^{f_1}$ $15 \cdot [t-50\frac{10}{27}]^+ = 25$ $t = 52\frac{1}{27}$
B^{f_1}		$\alpha^{f_1}(T_{v_2}^{\text{l.o.}f_1}) = 5 \cdot 33\frac{13}{64} + 25$ $= 191\frac{1}{64}$	$\alpha^{f_1}(T_{\text{e2e}}^{\text{l.o.}f_1}) = 5 \cdot 50\frac{10}{27} + 25$ $= 276\frac{23}{27}$

A recursive SFA calculation using the SFA left-over service curve to calculate $\alpha_{v_1 v_2}^{f_2}$ (similar approach to PMOO) yields slightly tighter bounds, however, it is not implemented in the DISCO Network Calculator yet.

SFA		FIFO_MUX	ARB_MUX
$\alpha_{v2}^{xf1} = \alpha^{f_2} \oslash \beta_{\text{e2e}}^{\text{l.o.}f_0} = \gamma_{r_{v2}^{xf1}, b_{v2}^{xf1}}$	$\beta_{\text{e2e}}^{\text{l.o.}f_0}$	$= \beta_{15,47.5}$	$= \beta_{15,63\frac{1}{3}}$
	r^{xf_1}	$= r^{f_2} = 5$	
	b^{xf_1}	$\alpha^{f_2}(T_{\text{e2e}}^{\text{l.o.}f_0}) = 5 \cdot 47.5 + 25 = 262.5$	$\alpha^{f_2}(T_{\text{e2e}}^{\text{l.o.}f_0}) = 5 \cdot 63\frac{1}{3} + 25 = 341\frac{2}{3}$
	$=$	$= \gamma_{5,262.5}$	$= \gamma_{5,341\frac{2}{3}}$
$\beta_{\text{e2e}}^{\text{l.o.}f_1} = \beta_{v_2}^{\text{l.o.}f_1} = \beta_{R_{v_2}^{\text{l.o.}f_1}, T_{v_2}^{\text{l.o.}f_1}}$	$R_{v_2}^{\text{l.o.}f_1}$	$= [R_{v_0} - r^{xf_1}]^+ = 15$	
	$T_{v_2}^{\text{l.o.}f_1}$	$\beta_{v_2} = b^{xf_1}$ $20 \cdot [t-20]^+ = 262.5$ $t = 33.125$	$\beta_{v_2} = \alpha^{xf_1}$ $20 \cdot [t-20]^+ = 5 \cdot t + 341\frac{2}{3}$ $t = 49\frac{4}{9}$
	$=$	$=\beta_{15,33.125}$	$=\beta_{15,49\frac{4}{9}}$
D^{f_1}		$\beta_{\text{e2e}}^{\text{l.o.}f_1} = b^{f_1}$ $15 \cdot [t-33.125]^+ = 25$ $t = 34\frac{19}{24}$	$\beta_{\text{e2e}}^{\text{l.o.}f_1} = b^{f_1}$ $15 \cdot [t-49\frac{4}{9}]^+ = 25$ $t = 51\frac{1}{9}$
B^{f_1}		$\alpha^{f_1}(T_{\text{e2e}}^{\text{l.o.}f_1}) = 5 \cdot 33\frac{1}{8} + 25 = 190\frac{5}{8}$	$\alpha^{f_1}(T_{\text{e2e}}^{\text{l.o.}f_1}) = 5 \cdot 49\frac{4}{9} + 25 = 272\frac{2}{9}$

PMOO		ARB_MUX
$\alpha_{v2}^{xf1} = \alpha^{f_2} \oslash \beta_{\text{e2e}}^{\text{l.o.}f_0} = \gamma_{r_{v2}^{xf1}, b_{v2}^{xf1}}$	$\beta_{\text{e2e}}^{\text{l.o.}f_0}$	$= \beta_{15,55}$
	r^{xf_1}	$= f^{f_2} = 5$
	b^{xf_1}	$\alpha^{f_2}(T_{\text{e2e}}^{\text{l.o.}f_0}) = 5 \cdot 55 + 25 = 300$
	$=$	$= \gamma_{5,300}$
$\beta_{\text{e2e}}^{\text{l.o.}f_1} = \beta_{v_2}^{\text{l.o.}f_1} = \beta_{R_{v_2}^{\text{l.o.}f_1}, T_{v_2}^{\text{l.o.}f_1}}$	$R_{v_2}^{\text{l.o.}f_1}$	$= 15$
	$T_{v_2}^{\text{l.o.}f_1}$	$\beta_{v_2} = \alpha^{xf_1}$ $20 \cdot [t-20]^+ = 5 \cdot t + 300$ $t = 46\frac{2}{3}$
	$=$	$=\beta_{15,46\frac{2}{3}}$
D^{f_1}		$\beta_{\text{e2e}}^{\text{l.o.}f_1} = b^{f_1}$ $15 \cdot [t - 46\frac{2}{3}]^+ = 25$ $t = 48\frac{1}{3}$
B^{f_1}		$\alpha^{f_1}(T_{\text{e2e}}^{\text{l.o.}f_1}) = 5 \cdot 46\frac{2}{3} + 25 = 258\frac{1}{3}$

Flow f_2

TFA bounds for flow f_2 can be calculated from the results for f_0 and f_2.

TFA	FIFO_MUX	ARB_MUX
$D^{f_2} = D^{f_0} + D^{f_1}$	$55 + 34\frac{29}{64} = 89\frac{29}{64}$	$110 + 78\frac{5}{90} = 188\frac{5}{90}$
$B^{f_2} = \max\{B^{f_0}, B^{f_1}\}$	$\max\{450, 489\frac{1}{16}\} = 489\frac{1}{16}$	$\max\{450, 508\frac{5}{9}\} = 508\frac{5}{9}$

Although SFA does not recursively calculate the necessary output bounds, it yields the right result if there's no cross traffic coming from outside the flow of interest's path.

SFA		FIFO_MUX	ARB_MUX
$\beta_{v_2}^{\text{l.o.}f_2} = [\beta_{v_0} - \alpha^{f_1}]^+ = \beta_{R_{v_2}^{\text{l.o.}f_2}, T_{v_2}^{\text{l.o.}f_2}}$	$R_{v_2}^{\text{l.o.}f_2}$	$= R_{v_2} - r^{f_1} = 15$	
	$T_{v_2}^{\text{l.o.}f_2}$	$\beta_{v_2} = b_{v_2}^{f_1}$ $20 \cdot [t-20]^+ = 25$ $t = 21.25$	$\beta_{v_2} = \alpha_{v_2}^{f_1}$ $20 \cdot [t-20]^+ = 5 \cdot t + 25$ $t = 28\frac{1}{3}$
	$=$	$= \beta_{15,21.25}$	$= \beta_{15,28\frac{1}{3}}$
$\beta_{\text{e2e}}^{\text{l.o.}f_2} = \beta_{\text{e2e}}^{\text{l.o.}f_0} \otimes \beta_{v_2}^{\text{l.o.}f_1}$	$=$	$= \beta_{15,47\frac{1}{2}} \otimes \beta_{15,21\frac{1}{4}} = \beta_{15,68\frac{3}{4}}$	$= \beta_{15,63\frac{1}{3}} \otimes \beta_{15,28\frac{1}{3}} = \beta_{15,91\frac{2}{3}}$
D^{f_2}		$\beta_{\text{e2e}}^{\text{l.o.}f_2} = b^{f_2}$ $15 \cdot [t - 68\frac{3}{4}]^+ = 25$ $t = 70\frac{5}{12}$	$\beta_{\text{e2e}}^{\text{l.o.}f_2} = b^{f_2}$ $15 \cdot [t - 91\frac{2}{3}]^+ = 25$ $t = 93\frac{1}{3}$
B^{f_2}		$\alpha^{f_2}(T_{v_2}^{\text{l.o.}f_2}) = 5 \cdot 68\frac{3}{4} + 25$ $= 368\frac{3}{4}$	$\alpha^{f_2}(T_{\text{e2e}}^{\text{l.o.}f_2}) = 5 \cdot 91\frac{2}{3} + 25$ $= 483\frac{1}{3}$

$$\beta_{\text{e2e}}^{\text{l.o.}f_2} = \beta_{\text{e2e}}^{\text{l.o.}f_0} \otimes \beta_{v_2}^{\text{l.o.}f_1} = \beta_{\text{e2e}}^{\text{l.o.}f_0} \otimes [\beta_{v_2} - \alpha^{f_1}]^+$$

PMOO	ARB_MUX
$\beta_{\text{e2e}}^{\text{l.o.}f_2} = \beta_{v_2}^{\text{l.o.}f_1} = \beta_{15,28\frac{1}{3}}$	
$\beta_{\text{e2e}}^{\text{l.o.}f_2} = \beta_{\text{e2e}}^{\text{l.o.}f_0} \otimes \beta_{v_2}^{\text{l.o.}f_1}$	$= \beta_{15,55} \otimes \beta_{15,28\frac{1}{3}} = \beta_{15,83\frac{1}{3}}$
D^{f_2}	$\begin{aligned} \beta_{\text{e2e}}^{\text{l.o.}f_2} &= b^{f_1} \\ 15 \cdot [t - 83\frac{1}{3}] &= 25 \\ t &= 85 \end{aligned}$
B^{f_2}	$\begin{aligned} \alpha^{f_0}(T_{\text{e2e}}^{\text{l.o.}f_0}) &= 5 \cdot 83\frac{1}{3} + 25 \\ &= 441\frac{2}{3} \end{aligned}$