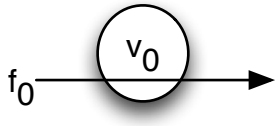
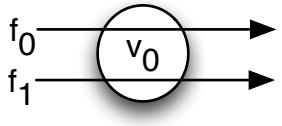
Node_1Flow.java



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

<table>
<tr><th colspan="2"></th><th>FIFO_MUX</th><th>ARB_MUX</th></tr>
<tr><td rowspan="2">TFA</td><td>D^{f_0}</td><td>$\beta_{v_0} = b^{f_0}$
$10 \cdot [t-10]^+ = 25$
$t = 12.5$</td><td>$\beta_{v_0} = \alpha^{f_0}$
$10 \cdot [t-10]^+ = 5 \cdot t + 25$
$t = 25$</td></tr>
<tr><td>B^{f_0}</td><td colspan="2">$\alpha^{f_0}(T_{v_0}) = 5 \cdot 10 + 25$
$= 75$</td></tr>
<tr><td rowspan="3">SFA</td><td>$\beta_{\text{e2e}}^{\text{l.o.}f_0}$</td><td colspan="2">$\beta_{R_{\text{e2e}}^{\text{l.o.}f_0},T_{\text{e2e}}^{\text{l.o.}f_0}} = \beta_{R_{v_0},T_{v_0}}$ due to lack of crossflows</td></tr>
<tr><td>D^{f_0}</td><td colspan="2">$\beta_{\text{e2e}}^{\text{l.o.}f_0} = b^{f_0}$
$10 \cdot [t-10]^+ = 25$
$t = 12.5$</td></tr>
<tr><td>B^{f_0}</td><td colspan="2">$\alpha^{f_0}(T_{\text{e2e}}^{\text{l.o.}f_0}) = 5 \cdot 10 + 25$
$= 75$</td></tr>
<tr><td rowspan="3">PMOO</td><td>$\beta_{\text{e2e}}^{\text{l.o.}f_0}$</td><td rowspan="3">not implemented</td><td>$= \beta_{R,T}$</td></tr>
<tr><td>D^{f_0}</td><td>$\beta_{\text{e2e}}^{\text{l.o.}f_0} = b^{f_0}$
$10 \cdot [t-10]^+ = 25$
$t = 12.5$</td></tr>
<tr><td>B^{f_0}</td><td>$\alpha^{f_0}(T_{\text{e2e}}^{\text{l.o.}f_0}) = 5 \cdot 10 + 25$
$= 75$</td></tr>
</table>

Node_2Flows_1AC.java



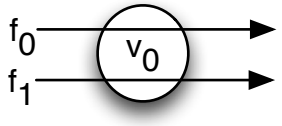
- $\beta_{v_0} = \beta_{R_{v_0}, T_{v_0}} = \beta_{10,10}$
- $\alpha^{f_0} = \alpha^{f_1} = \gamma_{r^{f_i}, b^{f_i}} = \gamma_{5,25}$, $i \in \{0, 1\}$

Flows f_0, f_1

TFA results will be equal for all flows as they share the same path of servers.
SFA and PMOO are equal in single hop networks.

			FIFO_MUX	ARB_MUX
TFA	α^{sum}		$\alpha^{f_0} + \alpha^{f_1} = \gamma_{10,50} = \gamma_{r^{\text{sum}},b^{\text{sum}}} = \gamma^{\text{sum}}$	
	D^{f_i}		$\beta_{v_0} = b^{\text{sum}}$ $10 \cdot [t-10]^+ = 50$ $t = 15$	$\beta_{v_0} = \alpha^{\text{sum}}$ $10 \cdot [t-10]^+ = 10 \cdot t + 50$ $0 \cdot t = 150$ $\Rightarrow \quad D^{f_i} = \infty$
	B^{f_i}		$\alpha^{\text{sum}}(T_{v_0}) = 10 \cdot 10 + 50$ $= 150$	
SFA	$\beta_{v_0}^{\text{l.o.}f_i} = \beta_{R_{v_0}^{\text{l.o.}f_i}, T_{v_0}^{\text{l.o.}f_i}}$	$R_{v_0}^{\text{l.o.}f_i}$	$[R_{v_0} - r^{f_i}]^+ = 5$	
		$T_{v_0}^{\text{l.o.}f_i}$	$\beta_{v_0} = b^{f_i}$ $10 \cdot [t-10]^+ = 25$ $t = 12.5$	$\beta_{v_0} = \alpha^{f_i}$ $10 \cdot [t-10]^+ = 5 \cdot t + 25$ $t = 25$
		$=$	$=\beta_{5,12.5}$	$=\beta_{5,25}$
	$\beta_{\text{e2e}}^{\text{l.o.}f_i}$		$= \beta_{5,12.5}$	$= \beta_{5,25} = \beta_{v_0}^{\text{l.o.}f_i}$
	D^{f_i}		$\beta_{\text{e2e}}^{\text{l.o.}f_i} = b^{f_i}$ $5 \cdot [t-12.5]^+ = 25$ $t = 17.5$	$\beta_{\text{e2e}}^{\text{l.o.}f_i} = b^{f_i}$ $5 \cdot [t-25]^+ = 25$ $t = 30$
	B^{f_i}		$\alpha^{f_i}(T_{\text{e2e}}) = 5 \cdot 12.5 + 25$ $= 87.5$	$\alpha^{f_i}(T_{\text{e2e}}) = 5 \cdot 25 + 25$ $= 150$
PMOO	$\beta_{v_0}^{\text{l.o.}f_i} = \beta_{R_{v_0}^{\text{l.o.}f_i}, T_{v_0}^{\text{l.o.}f_i}}$	$R_{v_0}^{\text{l.o.}f_i}$	not implemented	$[R_{v_0} - r^{f_i}]^+ = 5$
		$T_{v_0}^{\text{l.o.}f_i}$		$\beta_{v_0} = \alpha^{f_i}$ $10 \cdot [t-10]^+ = 5 \cdot t + 25$ $t = 25$
		$=$		$=\beta_{5,25}$
	$\beta_{\text{e2e}}^{\text{l.o.}f_i}$			$=\beta_{v_0}^{\text{l.o.}f_i} \quad =\beta_{5,25}$
	D^{f_i}			$\beta_{\text{e2e}}^{\text{l.o.}f_i} = b^{f_i}$ $5 \cdot [t-25]^+ = 25$ $t = 30$
	B^{f_i}			$\alpha^{f_i}(T_{\text{e2e}}) = 5 \cdot 25 + 25$ $= 150$

Node_2Flow_2ACs.java



- $\beta_{v_0} = \beta_{R_{v_0},T_{v_0}} = \beta_{10,10}$
- $\alpha^{f_0} = \gamma_{r^{f_0},b^{f_0}} = \gamma_{4,10}$
- $\alpha^{f_1} = \gamma_{r^{f_1},b^{f_1}} = \gamma_{5,25}$

Flows f_0, f_1

TFA results will be equal for all flows as they share the same path of servers.

		FIFO_MUX	ARB_MUX
TFA	α^{sum}	$\alpha^{f_0} + \alpha^{f_1} = \gamma_{9,35} = \gamma_{r^{\text{sum}},b^{\text{sum}}} = \gamma^{\text{sum}}$	
	D^{f_i}	$\beta_{v_0} = b^{\text{sum}}$ $10 \cdot [t-10]^+ = 35$ $t = 13.5$	$\beta_{v_0} = \alpha^{\text{sum}}$ $10 \cdot [t-10]^+ = 9 \cdot t + 35$ $t = 135$
	B^{f_i}	$\alpha^{\text{sum}}(T_{v_0}) = 9 \cdot 10 + 35$ $= 125$	

Flow f_0

SFA and PMOO are equal in single hop networks.

			FIFO_MUX	ARB_MUX
SFA	$\beta_{v_0}^{\text{l.o.}f_0} = \beta_{R_{v_0}^{\text{l.o.}f_0}, T_{v_0}^{\text{l.o.}f_0}}$	$R_{v_0}^{\text{l.o.}f_0}$	$[R_{v_0} - r^{f_1}]^+ = 5$	
		$T_{v_0}^{\text{l.o.}f_0}$	$\beta_{v_0} = b^{f_1}$ $10 \cdot [t-10]^+ = 25$ $t = 12.5$	$\beta_{v_0} = \alpha^{f_1}$ $10 \cdot [t-10]^+ = 5 \cdot t + 25$ $t = 25$
		$=$	$=\beta_{5,12.5}$	$=\beta_{5,25}$
	$\beta_{\text{e2e}}^{\text{l.o.}f_0} = \beta_{R_{\text{e2e}}^{\text{l.o.}f_0}, T_{\text{e2e}}^{\text{l.o.}f_0}}$		$=\beta_{5,12.5}$	$= \beta_{5,25} = \beta_{v_0}^{\text{l.o.}f_i}$
	D^{f_0}		$\beta_{\text{e2e}}^{\text{l.o.}f_0} = b^{f_0}$ $5 \cdot [t-12.5]^+ = 10$ $t = 14.5$	$\beta_{\text{e2e}}^{\text{l.o.}f_0} = b^{f_0}$ $5 \cdot [t-25]^+ = 10$ $t = 27$
	B^{f_0}		$\alpha^{f_0}(T_{\text{e2e}}^{\text{l.o.}f_0}) = 4 \cdot 12.5 + 10$ $= 60$	$\alpha^{f_0}(T_{\text{e2e}}^{\text{l.o.}f_0}) = 4 \cdot 25 + 10$ $= 110$
PMOO	$\beta_{v_0}^{\text{l.o.}f_0} = \beta_{R_{v_0}^{\text{l.o.}f_0}, T_{v_0}^{\text{l.o.}f_0}}$	$R_{v_0}^{\text{l.o.}f_0}$	not implemented	$[R_{v_0} - r^{f_1}]^+ = 5$
		$T_{v_0}^{\text{l.o.}f_0}$		$\beta_{v_0} = \alpha^{f_1}$ $10 \cdot [t-10]^+ = 5 \cdot t + 25$ $t = 25$
		$=$		$=\beta_{5,25}$
	$\beta_{\text{e2e}}^{\text{l.o.}f_0} = \beta_{R_{\text{e2e}}^{\text{l.o.}f_0}, T_{\text{e2e}}^{\text{l.o.}f_0}}$			$=\beta_{v_0}^{\text{l.o.}f_0} \quad =\beta_{5,25}$
	D^{f_0}			$\beta_{\text{e2e}}^{\text{l.o.}f_0} = b^{f_0}$ $5 \cdot [t-25]^+ = 10$ $t = 27$
	B^{f_0}			$\alpha^{f_0}(T_{\text{e2e}}^{\text{l.o.}f_0}) = 4 \cdot 25 + 10$ $= 110$

Flow f_1

SFA and PMOO are equal in single hop networks.

			FIFO_MUX	ARB_MUX
SFA	$\beta_{v_0}^{\text{l.o.}f_1} = \beta_{R_{v_0}^{\text{l.o.}f_1}, T_{v_0}^{\text{l.o.}f_1}}$	$R_{v_0}^{\text{l.o.}f_1}$	$[R_{v_0} - r^{f_0}]^+ = 6$	
		$T_{v_0}^{\text{l.o.}f_1}$	$\beta_{v_0} = b^{f_0}$ $10 \cdot [t-10]^+ = 10$ $t = 11$	$\beta_{v_0} = \alpha^{f_0}$ $10 \cdot [t-10]^+ = 4 \cdot t + 10$ $t = 18\frac{1}{3}$
		$=$	$=\beta_{6,11}$	$=\beta_{6,18\frac{1}{3}}$
	$\beta_{\text{e2e}}^{\text{l.o.}f_1} = \beta_{R_{\text{e2e}}^{\text{l.o.}f_1}, T_{\text{e2e}}^{\text{l.o.}f_1}}$		$=\beta_{6,11}$	$= \beta_{6,18\frac{1}{3}} = \beta_{v_0}^{\text{l.o.}f_1}$
	D^{f_0}		$\beta_{\text{e2e}}^{\text{l.o.}f_1} = b^{f_1}$ $6 \cdot [t-11]^+ = 25$ $t = 15\frac{1}{6}$	$\beta_{\text{e2e}}^{\text{l.o.}f_1} = b^{f_1}$ $6 \cdot [t-18\frac{1}{3}]^+ = 25$ $t = 22\frac{1}{2}$
	B^{f_0}		$\alpha^{f_1}(T_{\text{e2e}}^{\text{l.o.}f_1}) = 5 \cdot 11 + 25$ $= 80$	$\alpha^{f_1}(T_{\text{e2e}}^{\text{l.o.}f_1}) = 5 \cdot 18\frac{1}{3} + 25$ $= 116\frac{2}{3}$
PMOO	$\beta_{v_0}^{\text{l.o.}f_1} = \beta_{R_{v_0}^{\text{l.o.}f_1}, T_{v_0}^{\text{l.o.}f_1}}$	$R_{v_0}^{\text{l.o.}f_1}$	not implemented	$[R_{v_0} - r_0]^+ = 6$
		$T_{v_0}^{\text{l.o.}f_1}$		$\beta = \alpha_0$ $10 \cdot [t-10]^+ = 4 \cdot t + 10$ $t = 18\frac{1}{3}$
		$=$		$=\beta_{6,18\frac{1}{3}}$
	$\beta_{\text{e2e}}^{\text{l.o.}f_1} = \beta_{R_{\text{e2e}}^{\text{l.o.}f_1}, T_{\text{e2e}}^{\text{l.o.}f_1}}$			$=\beta_{v_0}^{\text{l.o.}f_1} \quad =\beta_{6,18\frac{1}{3}}$
	D^{f_0}			$\beta_{\text{e2e}} = b^{f_1}$ $6 \cdot [t-18\frac{1}{3}]^+ = 25$ $t = 22\frac{1}{2}$
	B^{f_0}			$\alpha^{f_1}(T_{\text{e2e}}^{\text{l.o.}f_1}) = 5 \cdot 18\frac{1}{3} + 25$ $= 116\frac{2}{3}$

Node_10Flow_10ACs.java

- $\beta_{v_0} = \beta_{R_{v_0},T_{v_0}} = \beta_{10,10}$
- for $i = 0$ to 9: $\alpha^{f_i} = \gamma_{r^{f_i},b^{f_i}} = \gamma_{0.1\cdot(i+1),1\cdot(i+1)}$

Flows f_0 - f_9

TFA results will be equal for all flows as they share the same path of servers.

		FIFO_MUX	ARB_MUX
TFA	α^{sum}	$\sum_{i=0}^{9} \alpha_i = \gamma_{5.5,55}$	
	D^{f_i}	$\beta_{v_0} = b^{\text{sum}}$ $10 \cdot [t-10]^+ = 55$ $t = 15.5$	$\beta_{v_0} = \alpha^{\text{sum}}$ $10 \cdot [t-10]^+ = 5.5 \cdot t + 55$ $t = 34\frac{4}{9}$
	B^{f_i}	$\alpha^{\text{sum}}(T) = 5.5 \cdot 10 + 55$ $= 110$	

Flow f_0

SFA and PMOO are equal in single hop networks.

			FIFO_MUX	ARB_MUX
crosstraffic $\alpha^{xf_0} = \gamma_{r^{xf_0},b^{xf_0}}$		r^{xf_0}	$\sum_{i=1}^{9} r^{f_i} = 5.4$	
		b^{xf_0}	$\sum_{i=1}^{9} b^{f_i} = 54$	
		$=$	$=\gamma_{5.4,54}$	
SFA	$\beta_{v_0}^{\text{l.o.}f_0} = \beta_{R_{v_0}^{\text{l.o.}f_0},T_{v_0}^{\text{l.o.}f_0}}$	$R_{v_0}^{\text{l.o.}f_0}$	$[R_{v_0} - r^{xf_0}]^+ = 4.6$	
		$T_{v_0}^{\text{l.o.}f_0}$	$\beta_{v_0} = b^{xf_0}$ $10 \cdot [t-10]^+ = 54$ $t = 15.4$	$\beta_{v_0} = \alpha^{xf_0}$ $10 \cdot [t-10]^+ = 5.4 \cdot t + 54$ $t = 33\frac{11}{23}$
		$=$	$=\beta_{4\frac{3}{5},15\frac{2}{5}}$	$=\beta_{4\frac{3}{5},33\frac{11}{23}}$
	$\beta_{\text{e2e}}^{\text{l.o.}f_0} = \beta_{R_{\text{e2e}}^{\text{l.o.}f_0},T_{\text{e2e}}^{\text{l.o.}f_0}}$		$=\beta_{4\frac{3}{5},15\frac{2}{5}}$	$= \beta_{4\frac{3}{5},33\frac{11}{23}} = \beta_{v_0}^{\text{l.o.}f_0}$
	D^{f_0}		$\beta_{\text{e2e}}^{\text{l.o.}f_0} = b^{f_0}$ $4\frac{3}{5} \cdot [t - 15\frac{2}{5}]^+ = 1$ $t = 15\frac{71}{115}$	$\beta_{\text{e2e}}^{\text{l.o.}f_0} = b^{f_0}$ $4\frac{3}{5} \cdot [t - 33\frac{11}{23}]^+ = 1$ $t = 33\frac{16}{23}$
	B^{f_0}		$\alpha^{f_0}(T_{\text{e2e}}^{\text{l.o.}f_0}) = 0.1 \cdot 15\frac{2}{5} + 1$ $= 2.54$	$\alpha^{f_0}(T_{\text{e2e}}^{\text{l.o.}f_0}) = 0.1 \cdot 33\frac{11}{23} + 1$ $= 4\frac{8}{23}$
PMOO	$\beta_{v_0}^{\text{l.o.}f_0} = \beta_{R_{v_0}^{\text{l.o.}f_0},T_{v_0}^{\text{l.o.}f_0}}$	$R_{v_0}^{\text{l.o.}f_0}$	not implemented	$[R_{v_0} - r^{xf_0}]^+ = 4.6$
		$T_{v_0}^{\text{l.o.}f_0}$		$\beta_{v_0} = \alpha^{xf_0}$ $10 \cdot [t-10]^+ = 5.4 \cdot t + 54$ $t = 33\frac{11}{23}$
		$=$		$=\beta_{4\frac{3}{5},33\frac{11}{23}}$
	$\beta_{\text{e2e}}^{\text{l.o.}f_0} = \beta_{R_{\text{e2e}}^{\text{l.o.}f_0},T_{\text{e2e}}^{\text{l.o.}f_0}}$			$=\beta_{v_0}^{\text{l.o.}f_0} \quad =\beta_{4\frac{3}{5},33\frac{11}{23}}$
	D^{f_0}			$\beta_{\text{e2e}}^{\text{l.o.}f_0} = b^{f_0}$ $4\frac{3}{5} \cdot [t - 33\frac{11}{23}]^+ = 1$ $t = 33\frac{16}{23}$
	B^{f_0}			$\alpha^{f_0}(T_{\text{e2e}}^{\text{l.o.}f_0}) = 0.1 \cdot 33\frac{11}{23} + 1$ $= 4\frac{8}{23}$

Flow f_6

SFA and PMOO are equal in single hop networks.

			FIFO_MUX	ARB_MUX
crosstraffic $\alpha^{xf_6} = \gamma_{r^{xf_6},b^{xf_6}}$		r^{xf_6}	$(\sum_{i=0}^{9} r^{f_i}) - r^{f_6} = 4.8$	
		b^{xf_6}	$(\sum_{i=0}^{9} b^{f_i}) - b^{f_6} = 48$	
		$=$	$=\gamma_{4.8,48}$	
SFA	$\beta_{v_0}^{\text{l.o.}f_6} = \beta_{R_{v_0}^{\text{l.o.}f_6},T_{v_0}^{\text{l.o.}f_6}}$	$R_{v_0}^{\text{l.o.}f_6}$	$[R_{v_0} - r^{xf_6}]^+ = 5.2$	
		$T_{v_0}^{\text{l.o.}f_6}$	$\beta_{v_0} = b^{xf_6}$ $10 \cdot [t-10]^+ = 48$ $t = 14.8$	$\beta_{v_0} = \alpha^{xf_6}$ $10 \cdot [t-10]^+ = 4.8 \cdot t + 48$ $t = 28\frac{6}{13}$
		$=$	$=\beta_{5.2,14.8}$	$=\beta_{5\frac{1}{5},28\frac{6}{13}}$
	$\beta_{\text{e2e}}^{\text{l.o.}f_6} = \beta_{R_{\text{e2e}}^{\text{l.o.}f_6},T_{\text{e2e}}^{\text{l.o.}f_6}}$		$=\beta_{5.2,14.8}$	$= \beta_{5\frac{1}{5},28\frac{6}{13}} = \beta_{v_0}^{\text{l.o.}f_6}$
	D^{f_6}		$\beta_{\text{e2e}}^{\text{l.o.}f_6} = b^{f_6}$ $5\frac{1}{5} \cdot [t-14.8]^+ = 7$ $t = 16\frac{19}{130}$	$\beta_{\text{e2e}}^{\text{l.o.}f_6} = b^{f_6}$ $5\frac{1}{5} \cdot [t-28\frac{6}{13}]^+ = 7$ $t = 29\frac{21}{26}$
	B^{f_6}		$\alpha^{f_6}(T_{\text{e2e}}^{\text{l.o.}f_6}) = 0.7 \cdot 14.8 + 7$ $= 17.36$	$\alpha^{f_6}(T_{\text{e2e}}^{\text{l.o.}f_6}) = 0.7 \cdot 28\frac{6}{13} + 7$ $= 26\frac{12}{13}$
PMOO	$\beta_{v_0}^{\text{l.o.}f_6} = \beta_{R_{v_0}^{\text{l.o.}f_6},T_{v_0}^{\text{l.o.}f_6}}$	$R_{v_0}^{\text{l.o.}f_6}$	not implemented	$[R_{v_0} - r^{xf_6}]^+ = 5.2$
		$T_{v_0}^{\text{l.o.}f_6}$		$\beta_{v_0} = \alpha^{xf_6}$ $10 \cdot [t-10]^+ = 4.8 \cdot t + 48$ $t = 28\frac{6}{13}$
		$=$		$=\beta_{5\frac{1}{5},28\frac{6}{13}}$
	$\beta_{\text{e2e}}^{\text{l.o.}f_6} = \beta_{R_{\text{e2e}}^{\text{l.o.}f_6},T_{\text{e2e}}^{\text{l.o.}f_6}}$			$=\beta_{v_0}^{\text{l.o.}f_6} \quad =\beta_{5\frac{1}{5},28\frac{6}{13}}$
	D^{f_6}			$\beta_{\text{e2e}}^{\text{l.o.}f_6} = b^{f_6}$ $5\frac{1}{5} \cdot [t-28\frac{6}{13}]^+ = 7$ $t = 29\frac{21}{26}$
	B^{f_6}			$\alpha^{f_6}(T_{\text{e2e}}^{\text{l.o.}f_6}) = 0.7 \cdot 28\frac{6}{13} + 7$ $= 26\frac{12}{13}$