Jif Label Syntax

	Symbol	Jif syntax	Example
Top principal	$\top$	* or $\top$	
Bottom principal	$\bot$	_ or $\bot$	
Conjunctive principal	p&q	p&q	Alice&Bob Alice&(Bob,Chuck)&Dave
Disjunctive principal	p,q	p,q	Alice, Bob, Chuck Alice, Bob&Chuck, Chuck&Dolores
Reader policy	$o \rightarrow r$	o:r *or* o$\rightarrow$r *or* o->r	_:_ is the least restrictive reader policy *:* is the most restrictive reader policy If no principle appears to the right of the colon, by default the top principal is used. Thus Alice: $\equiv$ Alice:*
Writer policy	$o \leftarrow w$	o!:w *or* o$\leftarrow$r *or* o<-r	_:_ is the most restrictive (lowest integrity) writer policy *:* is the least restrictive (highest integrity) writer policy If no principle appears to the right side, by default the top principal is used. Thus Alice$\leftarrow$ $\equiv$ Alice$\leftarrow$*
Reader policy joins and meets	$o \rightarrow r \sqcup o' \rightarrow r'$ $o \rightarrow r \sqcap o' \rightarrow r'$	o:r; o':r' o:r meet o':r' *or* o:r $\sqcap$ o':r'	Alice:; Bob:Chuck Alice: meet Bob:Chuck Alice: meet Bob:Chuck; Chuck: is the meet Alice: meet Bob:Chuck joined with Chuck!:
Writer policy joins and meets	$o \leftarrow r \sqcup o' \leftarrow r'$ $o \leftarrow r \sqcap o' \leftarrow r'$	o$\leftarrow$r; o'$\leftarrow$r' o$\leftarrow$r meet o'$\leftarrow$r' *or* o$\leftarrow$r $\sqcap$ o'$\leftarrow$r'	Alice<-; Bob<-Chuck Alice$\leftarrow$ $\top$ meet Bob$\leftarrow$Chuck Alice!: meet Bob!: Chuck; Chuck!: is the meet Alice!: meet Bob!:Chuck joined with Chuck!:
Label joins	$\{c; d\} \sqcup \{c'; d'\}$	$\{c; c'; d; d'\}$ *or* $\{c; d\} \sqcup \{c'; d'\}$	
Label meets	$\{c; d\} \sqcap \{c'; d'\}$	$\{c; d\} \sqcap \{c'; d'\}$ *or* $\{c; d\}$ meet $\{c'; d'\}$ *or* $\{c \sqcap c'; d \sqcap d'\}$ *or*	$\{$Alice$\rightarrow$Bob $\sqcap$ Chuck$\rightarrow$Dave; Alice$\leftarrow$ $\top$ $\sqcap$ Chuck$\leftarrow$ $\top\}$ $\{$Alice$\rightarrow$Bob; Alice$\leftarrow$ $\top\}$ meet $\{$Chuck$\rightarrow$Dave; Chuck$\leftarrow$ $\top\}$ Braces are useful for specifying order of label operations
Grouping	(L)	{L}	Grouping specifies the order of label operations

Interpreting Jif Labels

Jif Label	Meaning
{Alice:; L; Alice!:Bob}	$\{$Alice$\rightarrow \top$; Alice$\leftarrow$Bob$\} \sqcup$ L
{*lbl1; x; L meet *lbl2}	lbl1 $\sqcup$ x $\sqcup$ (L $\sqcap$ lbl2) No integrity or confidentiality policies appear in this label
{*lbl1; Alice$\leftarrow$}	$\{\bot \rightarrow \bot$; Alice$\leftarrow \top\} \sqcup$ lbl1 Since an integrity policy appears, the default confidentiality policy $\bot \rightarrow \bot$ is used
{*lbl1; Alice$\leftarrow$Bob; Chuck$\leftarrow \bot$; *lbl2; Alice$\rightarrow$Chuck; Chuck$\rightarrow$Dave}	$\{$Alice$\rightarrow$Chuck $\sqcup$ Chuck$\rightarrow$Dave; Alice$\leftarrow$Bob $\sqcup$ Chuck$\leftarrow \bot\} \sqcup$ lbl1 $\sqcup$ lbl2 The semicolon is consistently interpreted as a join operation for both confidentiality and integrity policies
{*lbl1}	lbl1 No integrity or confidentiality policy appears
{*lbl1 meet Alice:}	Error! Attempting to take the meet of a label (*lbl1) and a confidentiality policy (Alice:)
{*lbl1} meet {Alice:}	$\{$Alice$\rightarrow \top$; $\bot \leftarrow \bot\} \sqcap$ lbl1

References

[1] Jif Documentation 3.3.0 from https://www.cs.cornell.edu/jif/doc/jif-3.3.0/