

FAQ

1. Constraints of supply, demand, and transfer nodes?

In all types of problems, supply constraints are of the \leq form, demand constraints are of the \geq form, and the transfer nodes follow the equation “flow out” – “flow in” = 0.

J7									
	A	B	C	D	E	F	G	H	
1	Objective	min							
2	Variable Type								
3	non-neg?	Y							
4	Problem Type	MCNF							
5									
6									
7	START HERE	Chicago	Memphis	NY	Boston		FLOW IN = OUT (Y/N)	SUPPLY	
8	Denver	6	8				N	200	
9	LA	12	10				N	150	
10	Chicago			4	5		Y		
11	Memphis			5	7		Y		
12									
13	DEMAND			130	130				

For example, in the problem mentioned:

- The supply for Denver is 200, meaning the capacity at Denver is ≤ 200 .
- The demand for NY is 130, implying the capacity for NY is ≥ 130 .
- Chicago is a transfer node (marked “Y” in the FLOW IN = OUT column), meaning the equation “flow out” – “flow in” = 0 applies to it.

2. Where should I put “transfer nodes”?

The placement of transfer nodes within the matrix is not dictated by their position. They are determined to be “transfer nodes” based on the column labelled “FLOW IN = OUT”: “Y” indicates a transfer node, and “N” indicates it is not a transfer node.

3. Where should I put the “final destination node”?

In the “Shortest Path Problem” worksheet, which nodes are designated as the “final destination node” is independent of their position in the matrix.

L7											
	A	B	C	D	E	F	G	H	I	J	
1	Objective	min									
2	Variable Type										
3	non-neg?	Y									
4	Problem Type	MCNF									
5											
6											
7	START HERE	A	B	C	D	E	T		FLOW IN = OUT (Y/N)	SUPPLY	
8	O	2	5	4					N	1	
9	A		2		7				Y		
10	B				4	3			Y		
11	C		1			4			Y		
12	D						5		Y		
13	E				1		7		Y		
14											
15	DEMAND						1				

This tool identifies the “final destination node” based on the “DEMAND” row value: “1” signifies the “final destination node.” Similarly, the “initial node” is determined by the “SUPPLY” column value: “1” also represents the “final destination node.” Hence, the final destination node can appear in any column (aligned with "DEMAND," which pertains to a row), while the start node can be situated in any row but should not appear in a column.

4. What does a blank cell mean?

A blank cell in the matrix will prompt the assignment of a value of either -99999999 (if the objective is to maximize) or 99999999 (if the objective is to minimize) to the corresponding variable. Consequently, Gurobi will disregard paths through these cells.

M7	<div><div></div><div></div><div></div></div>	<div><div></div><div></div><div></div></div>	Maximum Flow Problem									
	A	B	C	D	E	F	G	H	I	J	K	
1	Objective	min										
2	Variable Type											
3	non-neg?	Y										
4	Problem Type	MFP										
5												
6												
7	START HERE	A	B	C	D	E	T	O		FLOW IN = OUT (Y/N)	SUPPLY	
8	O	5	7	4						Y		
9	A		1		3					Y		
10	B				4	5				Y		
11	C		2			4				Y		
12	D						9			Y		
13	E				1		6			Y		
14	T							9999999		Y		
15												
16	DEMAND											

Additionally, in the "Maximum Flow Problem," the capacities of "imaginary" arcs (in column O and row T) are set to a large default number (9999999) to prevent them from restricting the flow.