

! Keywords: Demand Backlog / Distribution / Inventory / Network / Product Management / Production / Reorder Point / Shipping / Transportation / Geographic;

MIN 5 X655 + 5 X652 + 5 X651 + 5 X645 + 5 X642 + 5 X641  
+ 4 X635 + 4 X632 + 4 X631 + 7 X625 + 7 X622 + 7 X621  
+ 9 X615 + 9 X612 + 9 X611 + 3 X565 + 3 X562 + 3 X561  
+ 6 X545 + 6 X542 + 6 X541 + 3 X535 + 3 X532 + 3 X531  
+ 8 X515 + 8 X512 + 8 X511 + 6 X465 + 6 X462 + 6 X461  
+ 5 X455 + 5 X452 + 5 X451 + 3 X435 + 3 X432 + 3 X431  
+ 3 X425 + 3 X422 + 3 X421 + 7 X415 + 7 X412 + 7 X411  
+ 5 X365 + 5 X362 + 5 X361 + 3 X355 + 3 X352 + 3 X351  
+ 2 X345 + 2 X342 + 2 X341 + 5 X315 + 5 X312 + 5 X311  
+ 6 X265 + 6 X262 + 6 X261 + 4 X255 + 4 X252 + 4 X251  
+ 2 X245 + 2 X242 + 2 X241 + 3 X235 + 3 X232 + 3 X231  
+ 9 X165 + 9 X162 + 9 X161 + 9 X155 + 9 X152 + 9 X151  
+ 8 X145 + 8 X142 + 8 X141 + 5 X135 + 5 X132 + 5 X131  
+ 4 X125 + 4 X122 + 4 X121

SUBJECT TO

! Balance constraints, for each commodity k, city i;

BAL11) X611 + X511 + X411 + X311 - X161 - X151 - X141  
- X131 - X121 = -25  
BAL12) X621 + X421 - X261 - X251 - X241 - X231 + X121 = 5  
BAL13) X631 + X531 + X431 - X361 - X351 - X341 - X311  
+ X231 + X131 = 9  
BAL14) X641 + X541 - X461 - X451 - X431 - X421 - X411  
+ X341 + X241 + X141 = 7  
BAL15) X651 - X561 - X541 - X531 - X511 + X451 + X351  
+ X251 + X151 = 0  
BAL16) - X651 - X641 - X631 - X621 - X611 + X561 + X461  
+ X361 + X261 + X161 = 4  
BAL21) X612 + X512 + X412 + X312 - X162 - X152 - X142  
- X132 - X122 = 0  
BAL22) X622 + X422 - X262 - X252 - X242 - X232 + X122 = -5  
BAL23) X632 + X532 + X432 - X362 - X352 - X342 - X312  
+ X232 + X132 = 4  
BAL24) X642 + X542 - X462 - X452 - X432 - X422 - X412  
+ X342 + X242 + X142 = 0  
BAL25) X652 - X562 - X542 - X532 - X512 + X452 + X352  
+ X252 + X152 = 1  
BAL26) - X652 - X642 - X632 - X622 - X612 + X562 + X462  
+ X362 + X262 + X162 = 0  
BAL51) X615 + X515 + X415 + X315 - X165 - X155 - X145  
- X135 - X125 = 0  
BAL52) X625 + X425 - X265 - X255 - X245 - X235 + X125 = 4  
BAL53) X635 + X535 + X435 - X365 - X355 - X345 - X315  
+ X235 + X135 = 0  
BAL54) X645 + X545 - X465 - X455 - X435 - X425 - X415  
+ X345 + X245 + X145 = 2  
BAL55) X655 - X565 - X545 - X535 - X515 + X455 + X355  
+ X255 + X155 = -14  
BAL56) - X655 - X645 - X635 - X625 - X615 + X565 + X465  
+ X365 + X265 + X165 = 8

! Capacity constraints, for each link i,j;

CAP12) X125 + X122 + X121 <= 2  
CAP13) X135 + X132 + X131 <= 3  
CAP14) X145 + X142 + X141 <= 2  
CAP15) X155 + X152 + X151 <= 1  
CAP16) X165 + X162 + X161 <= 20  
CAP23) X235 + X232 + X231 <= 2  
CAP24) X245 + X242 + X241 <= 8  
CAP25) X255 + X252 + X251 <= 3  
CAP26) X265 + X262 + X261 <= 9  
CAP31) X315 + X312 + X311 <= 3  
CAP34) X345 + X342 + X341 <= 1  
CAP35) X355 + X352 + X351 <= 3  
CAP36) X365 + X362 + X361 <= 9  
CAP41) X415 + X412 + X411 <= 5  
CAP42) X425 + X422 + X421 <= 4  
CAP43) X435 + X432 + X431 <= 6

CAP45)	X455 + X452 + X451	<=	5
CAP46)	X465 + X462 + X461	<=	9
CAP51)	X515 + X512 + X511	<=	1
CAP53)	X535 + X532 + X531	<=	2
CAP54)	X545 + X542 + X541	<=	7
CAP56)	X565 + X562 + X561	<=	9
CAP61)	X615 + X612 + X611	<=	9
CAP62)	X625 + X622 + X621	<=	9
CAP63)	X635 + X632 + X631	<=	9
CAP64)	X645 + X642 + X641	<=	9
CAP65)	X655 + X652 + X651	<=	9

END