

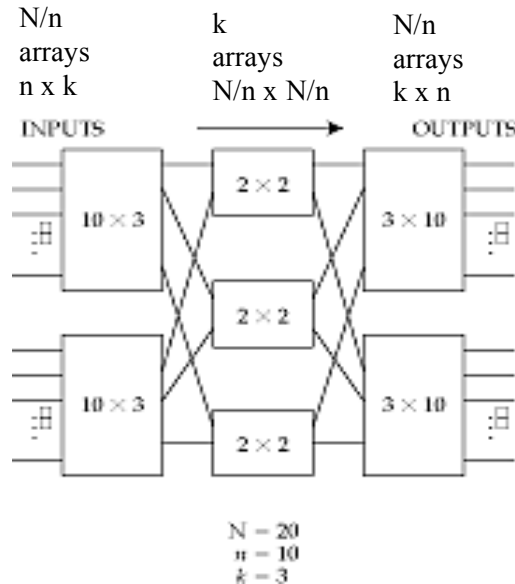
ATM networks

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What is the packetization delay for PCM voice (8000 samples/s) if cells are 64 bytes long ?

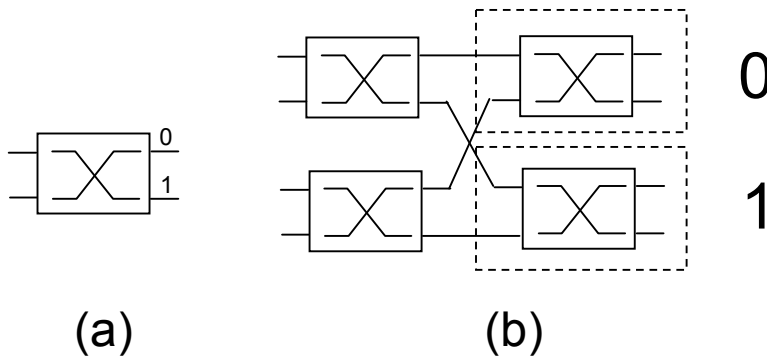
An ATM network is used to transport 12 E1 lines (E1 = 32 64kbit/s channels). What is the required ATM throughput if cell size is 53 bytes with 5 bytes reserved for the header ?

We can build multi-stage switches with simple crossbar elements as depicted by the following figure :



What is the gain in term of complexity when compared to a 20x20 crossbar ?

We also build multi-stage switches with basic 2x2 blocks (2 inputs, 2 outputs). The following figures show (a) an 2x2 element and (b) a 2-stage 4x4 switching element.



For the 4x4 switch, the method consists in considering that the upper-right block is associated to 0 and the lower-right block to 1. We then link the output of the left-most elements to the appropriate output block (upper outputs go to 0 and lower outputs go to 1).

Build and depict an 8x8 multi-stage switch using the same principle.

Let M be the total number of input lines of a switch, N be the number of inputs of a simple block, Y be the number of stages required and X be the number of simple element per stage. Find a relation between X, M and N, then relation between N, Y and M. To do so, use the 8x8 case seen above with N=2 (2x2 element). Build an 16x16 switch.