97-0612
Revised MIMO Definition

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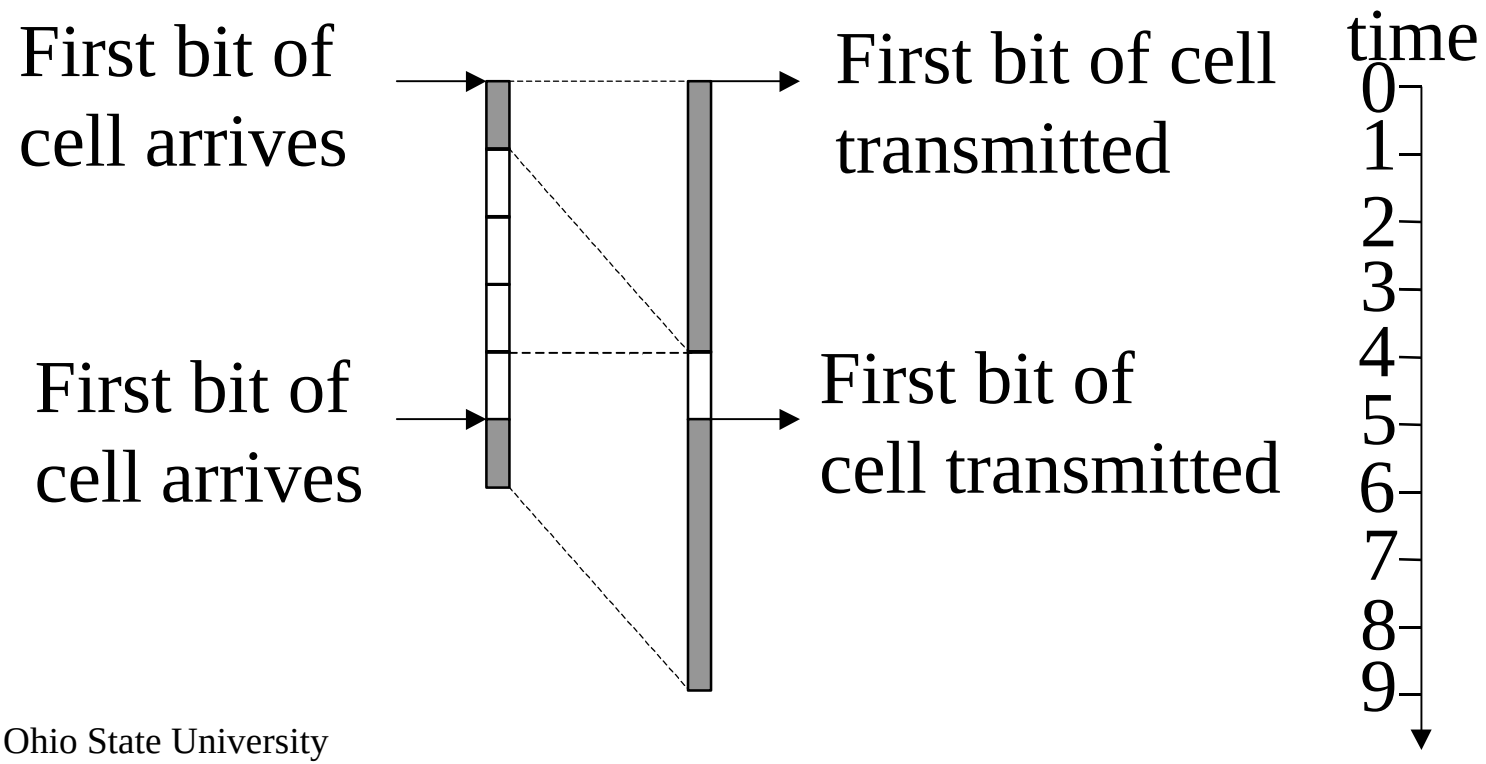
Frame Latency

- MIMO = FILO - NFOT
- NFOT = Normalized Frame Output Time
- Old Definition:
  NFOT = Frame input time × Output rate/Input Rate
- New Definition:
  NFOT = FILO latency through a zero-delay switch
- Initially $NFOT = 0$ and time t is measured from the arrival of the first bit of the first cell.
- For each cell with its first bit arriving at time t
  $\Rightarrow NFOT = max\{t, NFOT\} + CT$.
- CT = Max{Cell input time, Cell output time}

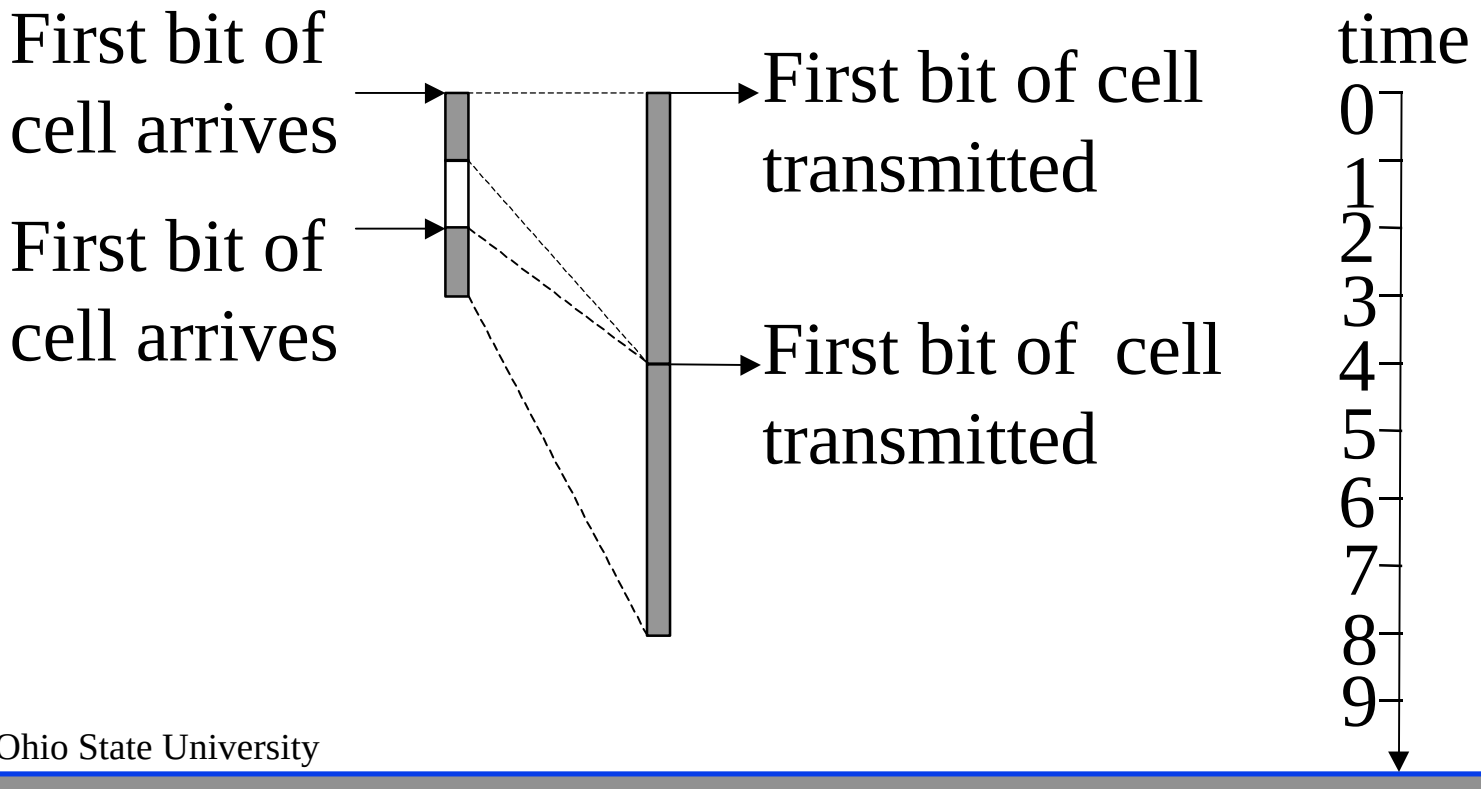
Example 1

- Input rate > Output rate
- CT = Cell Output Time = 4
- 2nd cell at 5: NFOT = max{5, 4} + 4 = 9



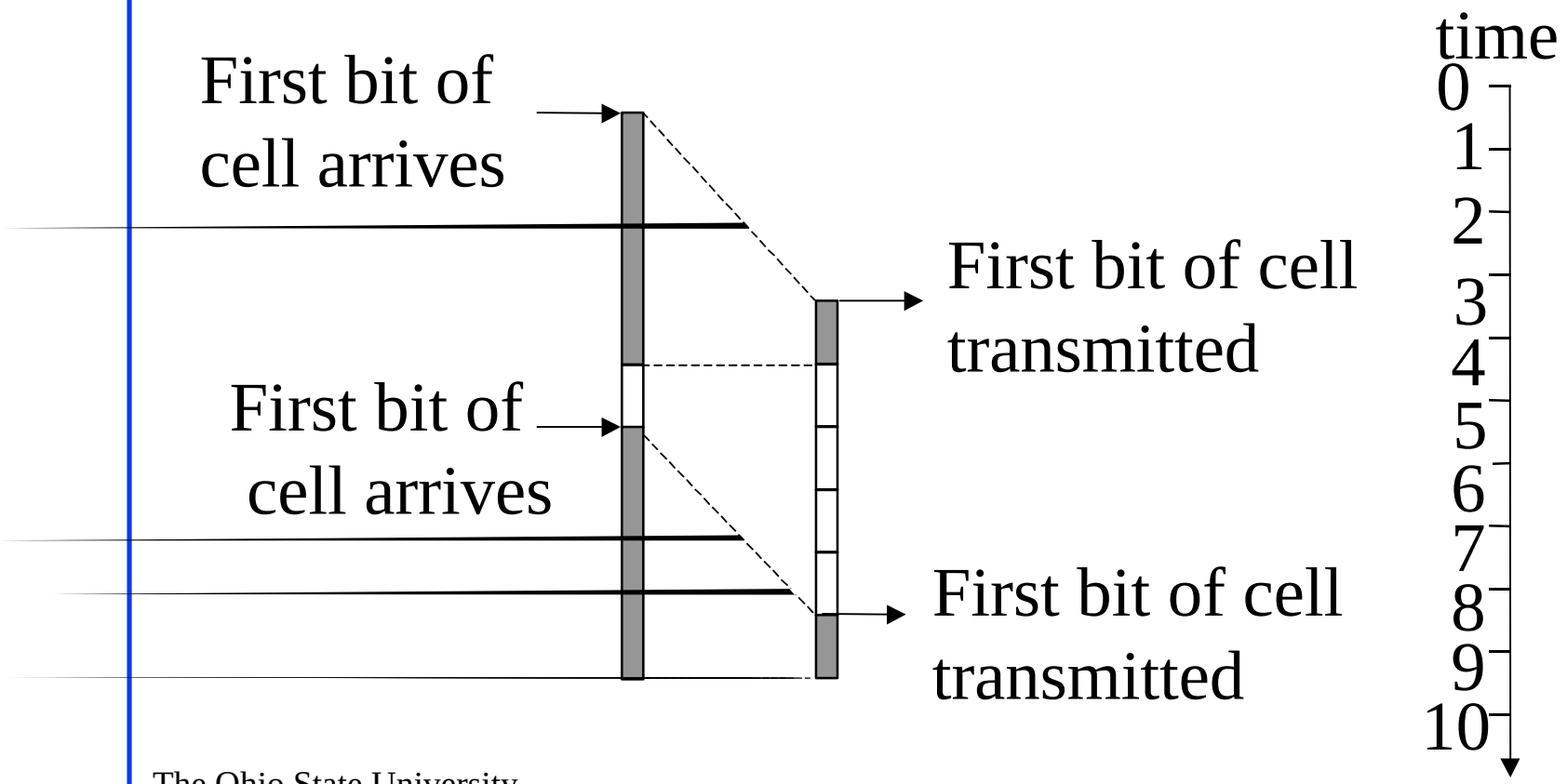
Example 2

- Input rate > Output rate
- CT = Max{1, 4} = 4
- 2nd Cell arrival at 2: NFOT = max {2, 4} + 4 = 8



Example 3

- Input rate < Output rate

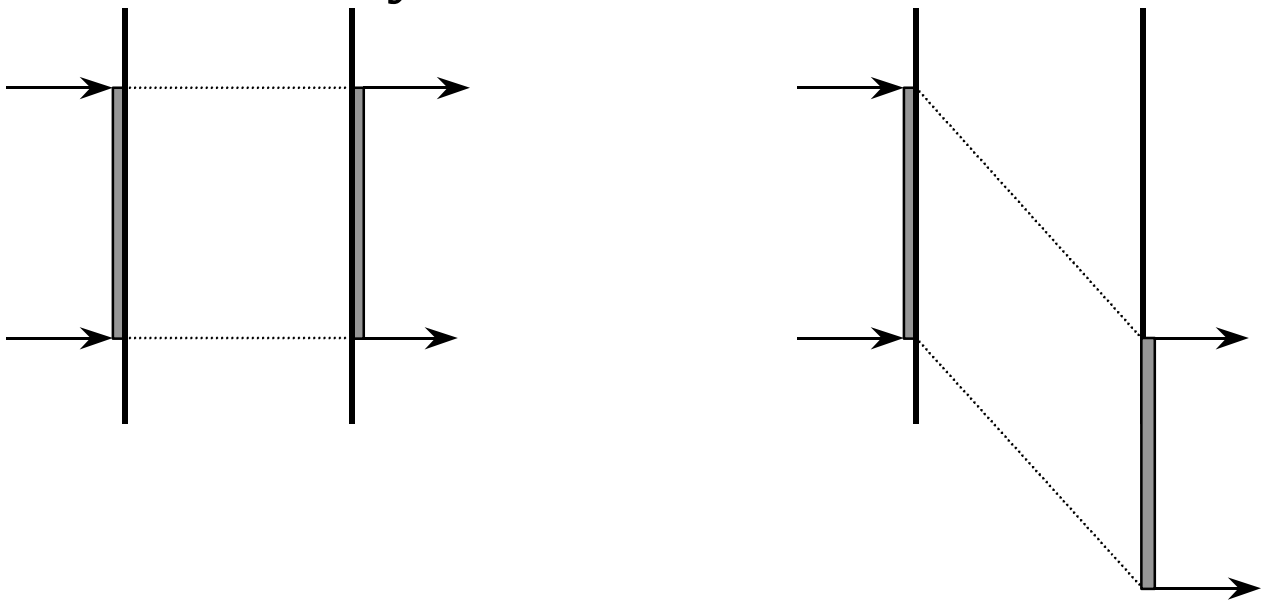


Revised MIMO Latency

- MIMO Latency = *FILO Latency* - *NFOT*
- *FILO latency* = Time between the first bit entry and the last bit exit
- *NFOT* = Nominal Frame Output Time: the time a frame needs to pass through the zero-delay switch, calculated as:
  Initially *NFOT* = *0* and time *t* is measured from the arrival of the first bit of the first cell. For each cell with its first bit arriving at time *t*
  $\Rightarrow NFOT = max\{t, NFOT\} + CT$.
- *CT* = Max{cell input, cell output time}

Key Difference

- Zero-Delay Switch:



(a) Ours (b) Theirs

- Calling "b" a zero-delay switch will make better switches negative delay switches.

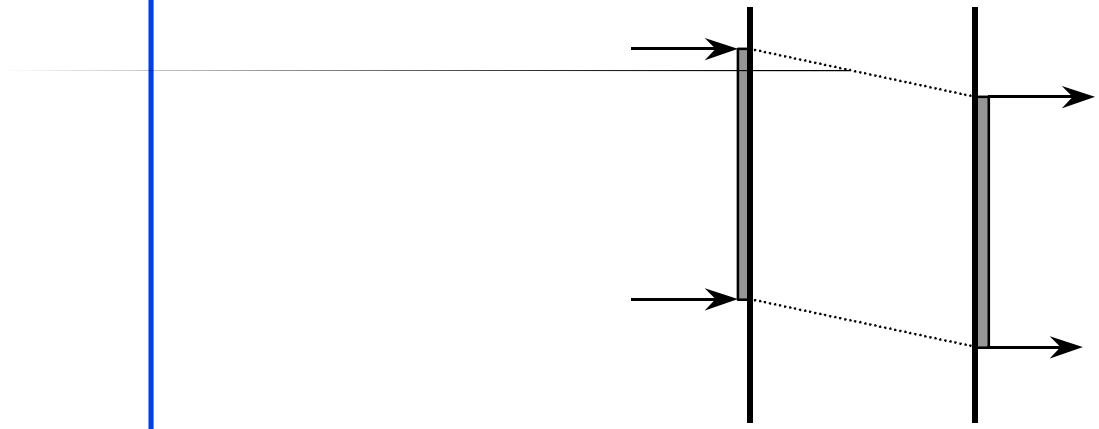
7. Wire

1 m long wire, 64 kbps

- Ours: 5 μs
- Theirs: -6.630 ms

6. Cut-Through Switches

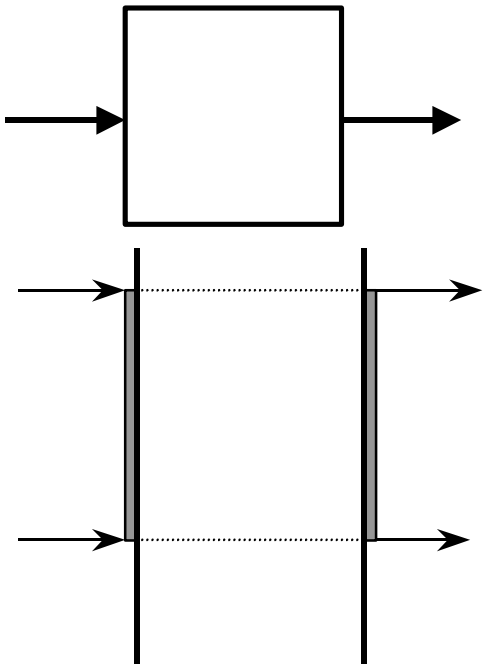
- Cut Through = A switch that looks at the 5-byte header and starts switching.
- At 64 kbps: 5 B = 0.625 ms, 53 B = 6.625 ms



Our: 0.625 ms

Their: -6 ms

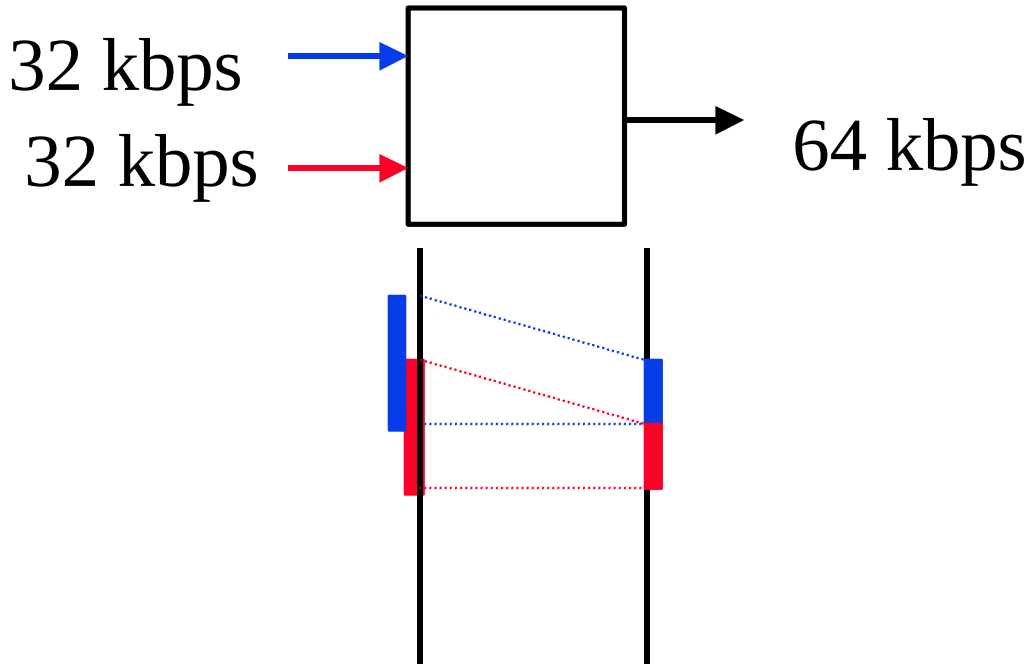
5. Repeaters



Our: 0 ms

Their: - 6.625 ms

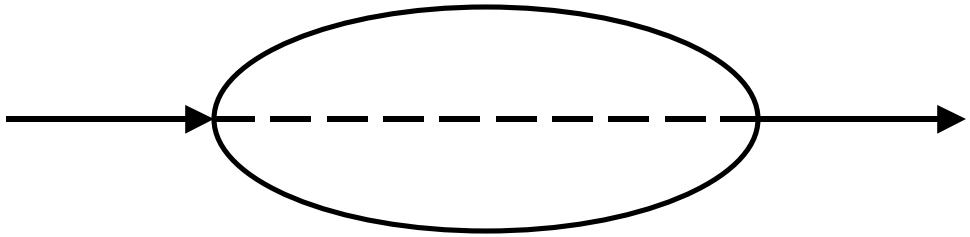
4. Multiplexers



Our: 0 ms

Their: - 6.625 ms

3. A Network



- If their definition does no apply to multiplexers or wires, it will not apply to networks that have only these.

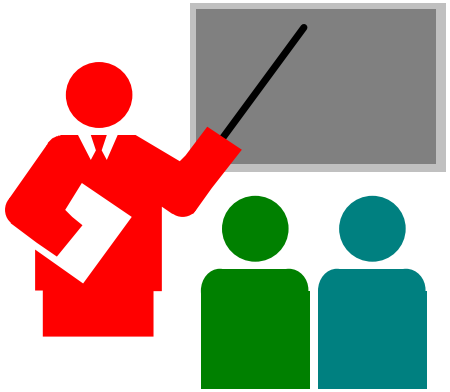
2. Frame Switches

- They define all 1-cell delay switches as zero-delay switches.
- Are all 1-frame delay switches also zero-delay switches?
- If yes, then what about cut-through frame switches? Most frame switches now a days uqe cut-through and will have negative delay by their definition.
- Their definition does not extend to frame (non-cell) switches.
- Why apply a definition that does not apply to other units of information?

1. No Negative Delay

- If you use our definition, no switch can have negative delay
- If you use their definition, all our zero delay switches have negative delays by their definition.
- All our zero-delay switches are feasible.

Motion



- Adopt the text under heading "Proposed Revised Text for Section 3.2.1" of 97-0612 to replace section 3.2.1 of Performance Testing Baseline Text.