Butterfly - Ideal throughput

\[ \Theta_{\text{term}} = \frac{bc}{\gamma_{\text{max}}} = \frac{6}{1} = 6 \]

Assume all channels have a channel bandwidth of \( b \)

\[ \Theta_{\text{term}} = \frac{bc}{\gamma_{\text{max}}} = \frac{6}{2} = 3b \]

Uniform random

\[ \Theta_{\text{term}} = \frac{bc}{\gamma_{\text{max}}} = \frac{b}{1} = b \]

Each tick mark is worth \( 1/4 \) units of traffic

Butterfly - Wireless lan

\[ T_0 = \frac{b}{c} + \frac{b}{c} + \frac{6}{b} \]

\[ = 2 \cdot 1 + 1 \cdot 1 + \frac{6}{b} = 4 / \text{cycle} \]
Mesh - Ideal Throughput

\[ \Theta_{\text{km}} = \frac{bc}{\sum_{i} a_i} = \frac{6}{1} = 6 \]

Uniform network

\[ \Theta_{\text{pm}} = \frac{bc}{\sum_{i} a_i} = \frac{b}{1} = b \] (limit by injection rate)

Mesh - 200 Links Version

For unitary normal:

- 0 → 0 \( H_c = 0 \)  \( \text{avg } H_c = \frac{y}{q} = 1 \)
- 0 → 1 \( H_c = 1 \)
- 0 → 2 \( H_c = 2 \)
- 0 → 3 \( H_c = 1 \)

\[ T_0 = H_c + H_c + C + 4/6 \]

\[ = 2 \cdot 1 + 1 \cdot 1 + 6/6 = 4 \text{ cycles} \]
4x4 mesh vs. cmesh

Assume message is 76

\[ \Theta_{\text{cmesh}} = \frac{6 \cdot 76}{16} = \frac{6 \cdot 4}{16} = 6 \]

Corner:

1 2 3 4 3 2 1
2 3 4 5 3 4 5

Middle:

0 1 1 2 2 1 2 3
3 2 3 4 4 3 4 5

Center:

0 2 1 2 3 1 2
2 1 2 3 2 3 4 3 2

48x4 + 40x8 + 32x4

= 640 \div (16 \cdot 16)

= 2.5

\[ T_0 = n_c t_a + n_c t_c + \frac{c}{16} \]

= 3.5 t_c + 2.5 t_c + 2

\[ T_0 = n_c t_a + n_c t_c + \frac{c}{16} \]

= 2 \cdot t_a + 16 t_c + 2

What should we set \( t_a \) to?