FDDI Analysis

Let TTRT = T (average token interval time)

Let $\alpha_0, \alpha_1, \ldots, \alpha_{m-1}$ be the THT for each of the m stations

$$\alpha_0 + \alpha_1 + \ldots + \alpha_{m-1} \leq T$$

Let $t_0, t_1, \ldots, t_{m-1}$ be the time of arrival of token at stations 0, 1, ..., m - 1

t_i, i > 0 is the time at which token reaches station i = i mod m in cycle i/m

$t_{-m}, \ldots, t_{-1}$, be the times at which token arrives at m, ..., 1 in the previous cycle

FDDI Analysis

If $t_i - t_{i-m} < T$, low priority frames transmitted

If $t_i - t_{i-m} > T$, no low priority frames transmitted

Both case high priority traffic transmitted

Time at which token reaches next node is

$$t_{i+1} = t_{i-m} + T + \alpha_i, \text{for } t_i - t_{i-m} < T, i \geq 0$$

$$t_{i+1} = t_i + \alpha_i, \text{for } t_i - t_{i-m} > T, i \geq 0$$

where $\alpha_i = \alpha_{i \bmod m}$ is the allocated transmission plus propagation time for node (i mod m)

FDDI Analysis

$$\text{Special case} : \alpha_i = 0, \text{ for all } i$$

$$t_{i+1} \leq \max\ (t_i , t_{i-m} + T), \ i \geq 0$$

$$\text{Since } t_{i-m} \leq t_i$$

$$t_{i+1} \leq t_i + T$$

$$\text{Similarly for } 1 \leq j \leq m + 1$$

$$t_{i+j} \leq t_i + T$$

$$\text{Hence } t_{i+m+1} \leq t_i + T, \text{ for all } i \geq 0$$

FDDI Analysis

Iterate over multiples of m + 1

$t_i \le t_{i \bmod (m+1)} + i/(m+1)T$ all $i > 0$

The m + 1 occurs to ensure that when stations

are heavily loaded every cycle a different transmits

First cycle station 0 transmits

Next cycle station 1 transmits , ...

t_m - station 0 transmits T

$t_{2m} = T \Rightarrow$ station 0 cannot transmit - token late

station 1 transmits $\Rightarrow$ fair share to all stations

Utilisation

$$U = \frac{1}{1 + a/N}$$

N - *number of stations*

a - *propagation delay*

1 - *time take to transmit a packet*

$$N \rightarrow \infty \; U \rightarrow 1$$