Metrics for CR Routing

1 Queing Delay based on Arbitrary Epoch.

$$D_{queing} = \frac{2\rho + 2}{f \, C \, (1 - 2\rho)(1 - \rho)}$$

C : System capacity , C = 1

f : flowsizes , f = 1.

ρ : load of the flow, $\rho = (0.05 - 0.45)$

n : number of nodes / flows.

Relay node rate = C / (n+1)

λ : arrival rate.

$$\rho = \frac{\lambda f}{C}$$

2 Delays.

Path Delay = $D_{switching, i} + D_{backoff, i}$

- $D_{switching, i} = \sum\limits_{j=i}^{H} k \, |\, Band_j - Band_{j+1}\,|$

  ↓ (handwritten annotation)   ↓ (handwritten annotation)

H : number of Hops between node i and destination

Tx Node i (annotation) channel 40 (annotation) channel 60

Channel 40 → 622 MHz
Channel 60 → 782 MHz

$$D_{switching, i} = \sum\limits_{j=i}^{1} \frac{10ms}{10MHz} \, |\, 622MHz - 782MHz\,|$$

$$= \frac{10ms}{10MHz} * 160 \, MHz \Rightarrow D_{switching} = \underline{160 \, msec}$$

- $D_{backoff, i} =$