Scheduling algorithm to avoid contention in meshed networks

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Introduction

1 Model & Problems

1.1 Model

Presenter le model : A rajouter par rapport a l'ancien
— la notion de buffers intermédiaires
— la métrique, on compte le temps différemment

2 General model and Problems

We use the notation $[n]$ to denote the interval of n integers $\{0, \ldots, n-1\}$.

2.1 Discrete time model

In the model presented here, the time is discrete. The unit of time is called a **tic**. This is the time needed to transmit an atomic data of size Q over the fastest link of the network. We consider that the speed of the links is the same over all the links of the network.

2.2 Network modeling

The network is modeled as a directed graph $G = (V, A)$. The **sending tic** of a message in a vertex u is the tic at which the beginning of this message is sent from u. Also, the **reception tic** of a message in a vertex v is the tic at which the beginning of the message arrives in v. Each arc

(u, v) in A is labeled by an integer weight $\Omega(u, v)$ which represents the number of tics elapsed between the sending tic of the message in u and the reception tic of this message in v using this arc. A **route** r in G is a directed path, that is, a sequence of adjacent vertices $u_0, \ldots, u_l$, with $(u_i, u_{i+1}) \in A$. The **weight of a vertex** u_i in a route $r = (u_0, \ldots, u_l)$ is defined by $\lambda(u_i, r) = \sum\limits_{0 \leq j < i} \Omega(u_j, u_{j+1})$. It is the number of tics needed between the sending tic of a message in the first vertex of the route and the reception tic of this message at u_i. We also define $\lambda(u_0, r) = 0$. The weight of the route r is defined by $\lambda(r) = \lambda(u_l, r)$. We denote by $\mathcal{R}$ a set of routes, the pair $(G, \mathcal{R})$ is called a **routed network** and represents our telecommunication network. The first vertex of a route models an antenna (RRH) and the last one a data-center (BBU) which computes an answer to the messages sent by the antenna.

A simplifier

- Le debit sur les flux, qu'on considère tous les mêmes.
- La notion de jitter, on ne s'y intéresse pas vraiment, mais c'est un point important pour justifier, peut être à remonter dans l'intro en le redéfinissant pour un réseau déterministe ?

2.3 Problems

Je propose de ne parler que de SPALL, nos résultats sur PALL conflict depth 2 sont très peu interessants

3 Topologies

Je propose de parler rapidement des deux topologies. On peut peut être faire une sous section parlant de l'étoile en expliquant pourquoi on à un bon algo fpt(en renvoyant sur l'autre papier) vu que ce n'est pas très long.

4 Algorithms

4.1 Greedy

Presenter les différents algo greedy, expliquer pourquoi on les essaye

4.2 Local Search

Differentes techniques de voisinages utilisées Notion de voisinage n1

4.3 FPT

Definir le voisinage, expliquer pourquoi ca nous donne un algo fpt, et le decrire

5 Results

6 Conclusion