Contents

1 Preface

The first part of the document describes the reasoning which led us to the construction of the current form of the QSPN v2. If you are just interested in the description of the QSPN v1 and v2 and you already know the concept of

2.3 The QSPN

Netsukuku implements its own algorithm, the *QSPN* (

4.2 Proprieties of the tracer packet

1. A node D which received a TP, can know the exact route covered by the TP. Therefore, D can know the route to reach the source node S, which sent the TP, and the routes to reach the nodes standing in the middle of the route.

   For example, suppose that the TP received by D is: $\{S, A, B, C, D\}$. By looking at the packet D will know that the route to reach B is $C \rightarrow B$ to reach A is $C \rightarrow B \rightarrow A$, and finally to reach S is $C \rightarrow B \rightarrow A \rightarrow S$. The same also applies for all the other nodes which received the TP, f.e, B

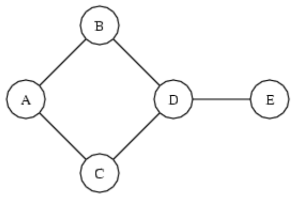


Figure 2: A simple g7aph with one segment and one cycle

Given this g7aph as input the algorithmh ill output:

$$A \to B \to D \to C$$
$$A \to B \to D \to E$$
$$A \to C \to D \to B$$
$$A \to C \to D \to E$$
$$B \to A \to C \to D \to E$$
$$B \to D \quad \to E$$
$$B \to \quad E \; \omega \; C$$
$$A \to B \to D \omega \; C \quad \to D \omega \; C \to$$
$$D \to E \; \omega \; E$$
$$B \to D \to E$$
$$B$$

7 Routes

9.1 Interesting information

A node considers a received CTP interesting when its body contains at least a new route, i.e. a route that the node didn't previously know. In other words, if a CTP contains routes already known by the node, it is considered uninteresting.

When a node receives an interesting CTP, it forwards the packet to all its neighbours, excepting the one from which it has received the CTP. If, instead, the CTP is uninteresting, it will drop the packet.

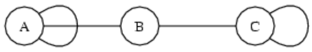
Note that

nodes. This is because an uninteresting CTP contains
previously received, memorised and forwarded by the
the other nodes already know the same routes too.

uppose 30(S)-28a.4.e. aleample

9.3 Cyclicity

When a CTP reaches the extremity of a segment, it is back forwarded, thus it's as if the extreme nodes had a link with themselves.



called *extreme nodes*

3. Q^2 doesn't need synchronization. the CTPs doesn't need to have an ID, thus many nodes can send simultaneously or asynchronously a CTP without creating any problem.
   This isn't the same in Q, which requires a strict synchronization between the nodes: two nodes can send a qclose only at the same time.

4. This is a consequence of the propriety described above: every time a node joins

Note [8]

4. If R

12.2 Disjoint routes

The routing table of each node should be differentiated, i.e. it should not contain redundant routes.

For example, consider these $S \rightarrow D$ routes:

$$SBCFG_1G_2G_3G_4G_5G_6G_7 \dots G_{19}D \tag{11}$$

$$SRTEG_1G_2G_3G_4G_5G_6G_7 \dots G_{19}D \tag{12}$$

$$SZXMNO_1O_2O_3O_4O_5D \tag{13}$$

$$SQPVY_1Y_2Y_3Y_4D \tag{14}$$

The first two are almost identical, indeed they differ only in the first three hops. The last two are, instead, totally different from all the others.
Since the first two routes are redundant, the node S should keep in memory only one of them, saving up space for the others non-redundant routes.

Keeping redundant routes in the routing table isn't optimal, because if one of the

13 Simulating the QSPN v2

As a proof of concept, we've a written the q2sim.py[6], a simulator implementing the core of the QSPN v2.
The q2sim is an event-oriented Discrete Event Simulator. Each (event,time) pair is pushed in aorityueue. Theainopfmeves theue
the event having the lowest 'time' value. This "popped" event is executed. In this case, the events are the packets sent on the network.

In this paragraph we'll analyze the results of va.ious simulations.

TP flux The *TP flux* of a node *n*

By increasing the number of starter nodes the mean TP flux increases slightly until it reaches $\Phi_m = k$. Indeed, if all the nodes of the graph are starters, then each of them will send a TP to all the other nodes. The increasing of the number of starter nodes

15 ChangeLog

- March 2007
  - New section: “Network dynamics” (11)
  - Description of the ETP (sec. 11.1)
  - Link ID section remove. With the ETP they are no more necessary.
  - More detailed description of the QSPN v1 (sec. 10)
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