CHAPTER 5

Simulation

In this chapter, we validate our proposal through comparing delay, throughput and packet drop rate with the simulator Qualnet. The parameters are listed in Table 3-1 and Table 3-2, the same as in section 3.6. The scenario 1 and scenario 2 are identical to those in section 3.6. But in this section, the VI (rtPS) delay is what we mainly concern about. Therefore, we just show the VI (rtPS) delay time and the result.

There are five lines we compare with. Original VI means we just run the scenario without any change in protocol. Constant r represents using Token Bucket mechanism but without tuning the token rate r. Variant r expresses using Token Bucket mechanism and it will tune the token rate r. CAC Constant r and CAC Variant r are similar to Constant r and Variant r but with CAC mechanism. Expect the Original VI, otherwise with our packet drop mechanism. The simulation result is as follows:

5.1. Delay

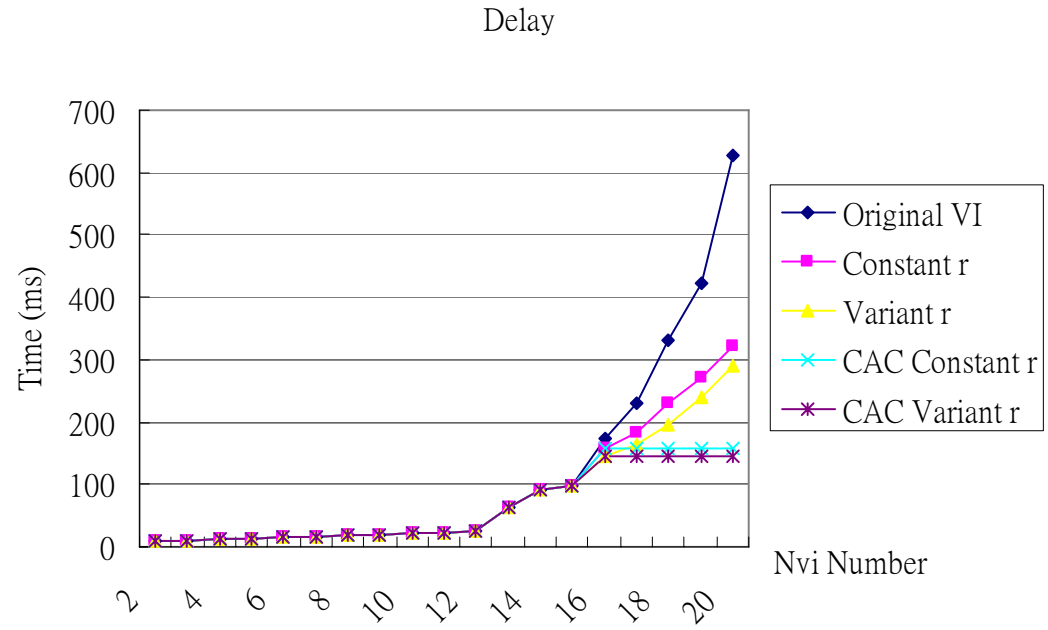

Figure 5-1: Scenario 1 – Delay time (N_{VI})

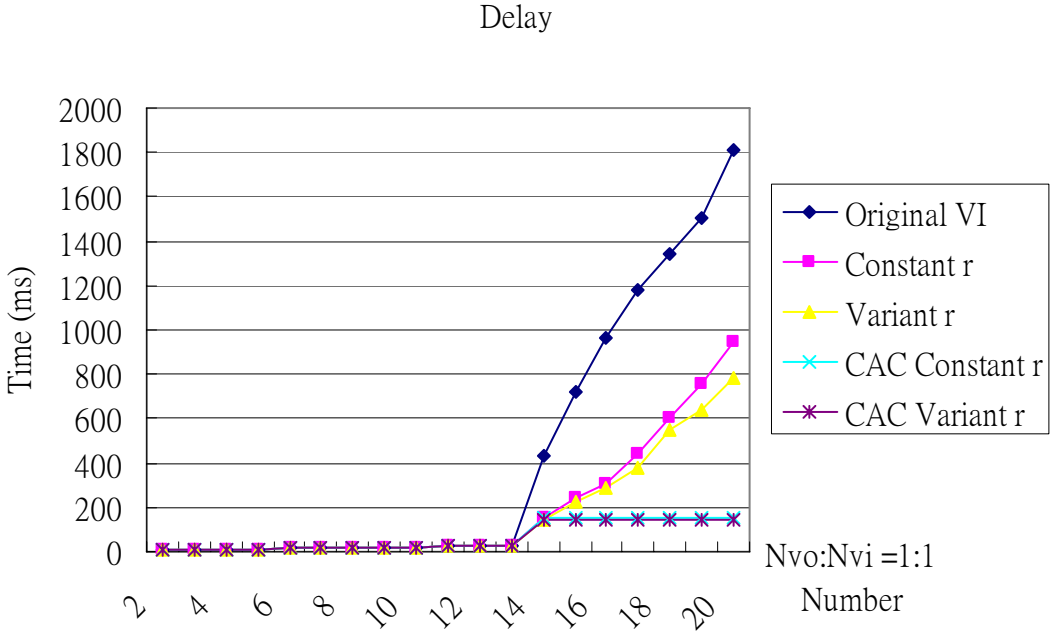

Figure 5-2: Scenario 2 – Delay time (N_{VO} : N_{VI} = 1 : 1)

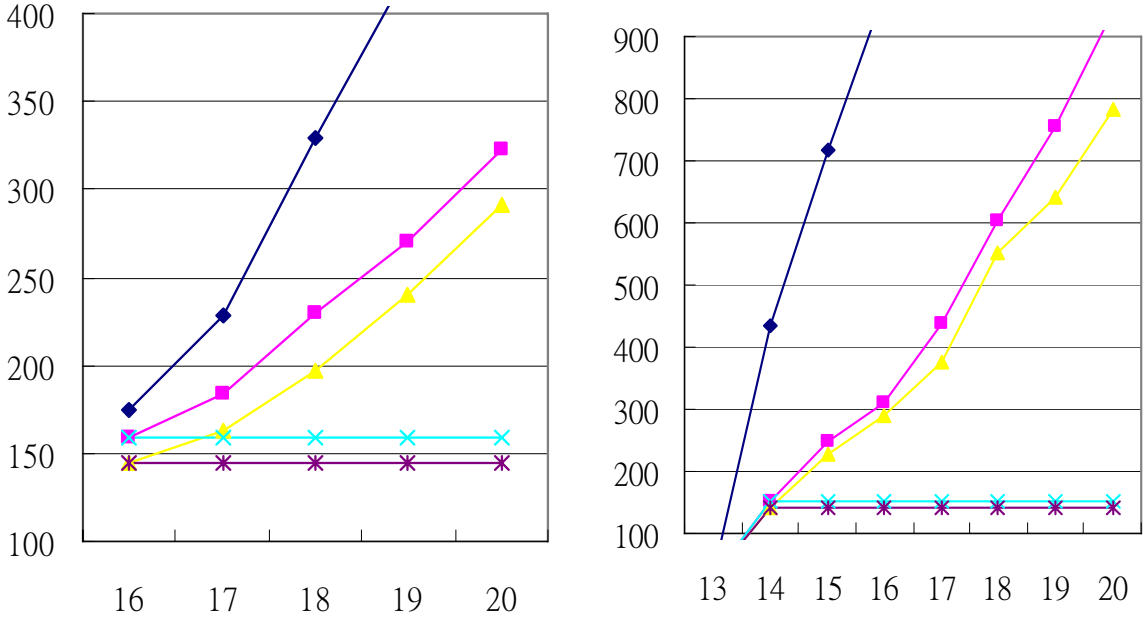

Figure 5-3: Enlarge – Delay (N_{VI}) (N_{VO} : N_{VI} = 1 : 1)

It represents the delay in Figure 5-1 and Figure 5-2 and we enlarge the major different part summarizing in Figure 5-3. Original VI delay decrease rapidly when the loading is heavy. The Constant r and Variant r are more moderate than Original VI, because of Token Bucket and Packet Drop mechanism. The delay of CAC Constant r and CAC Variant r are the smallest, resulting from CAC mechanism constrains the number of connections.

5.2. Packet Drop rate

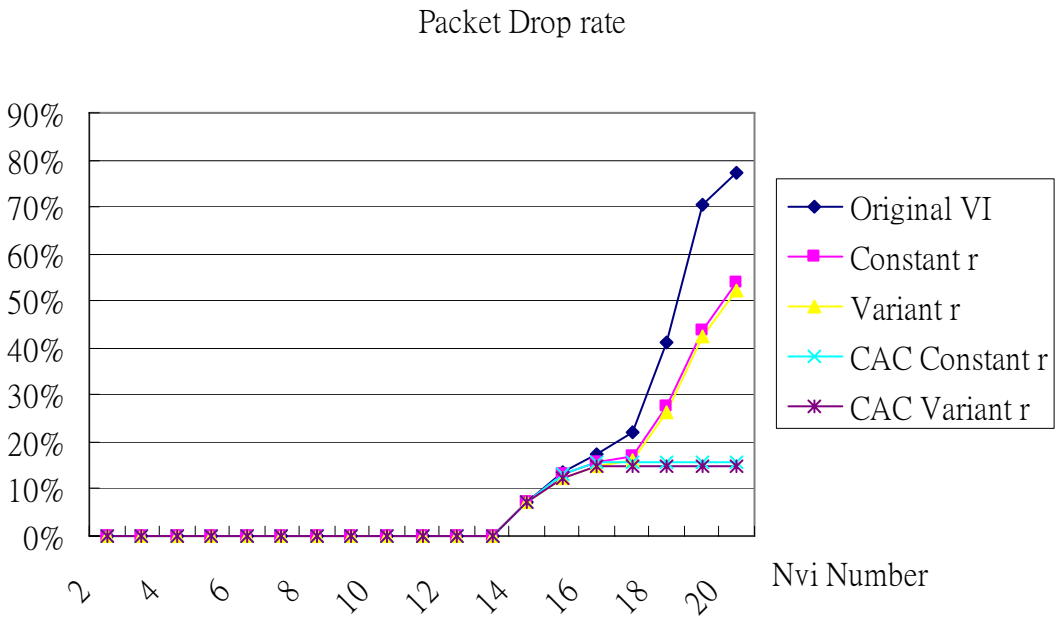

Figure 5-4: Scenario 1 – Packet drop rate (N_{VI})

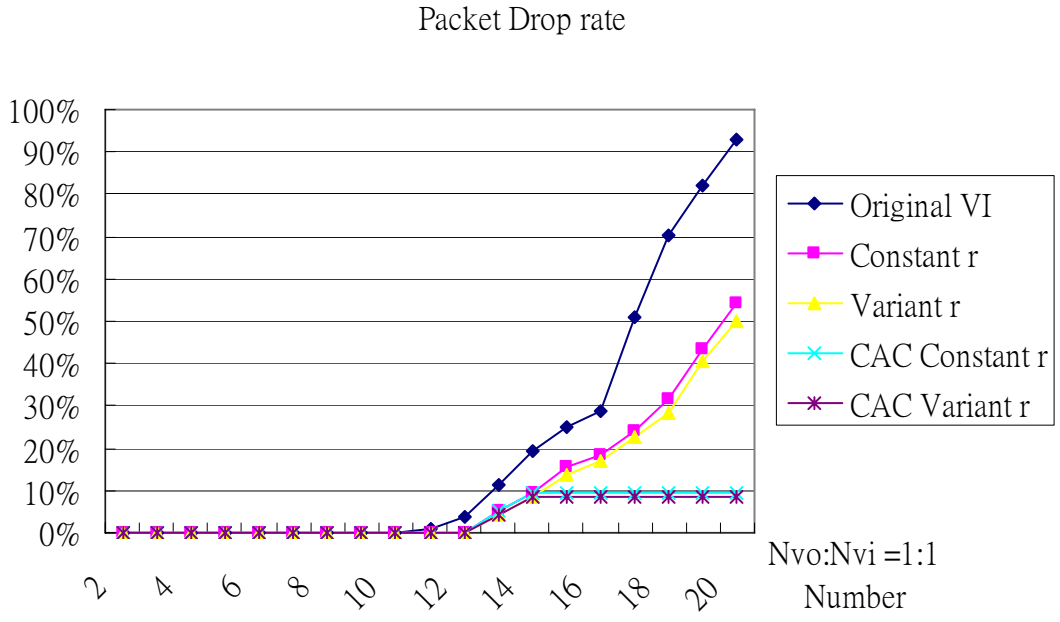

Figure 5-5: Scenario 2 – Packet drop rate (N_{VO} : N_{VI} = 1 : 1)

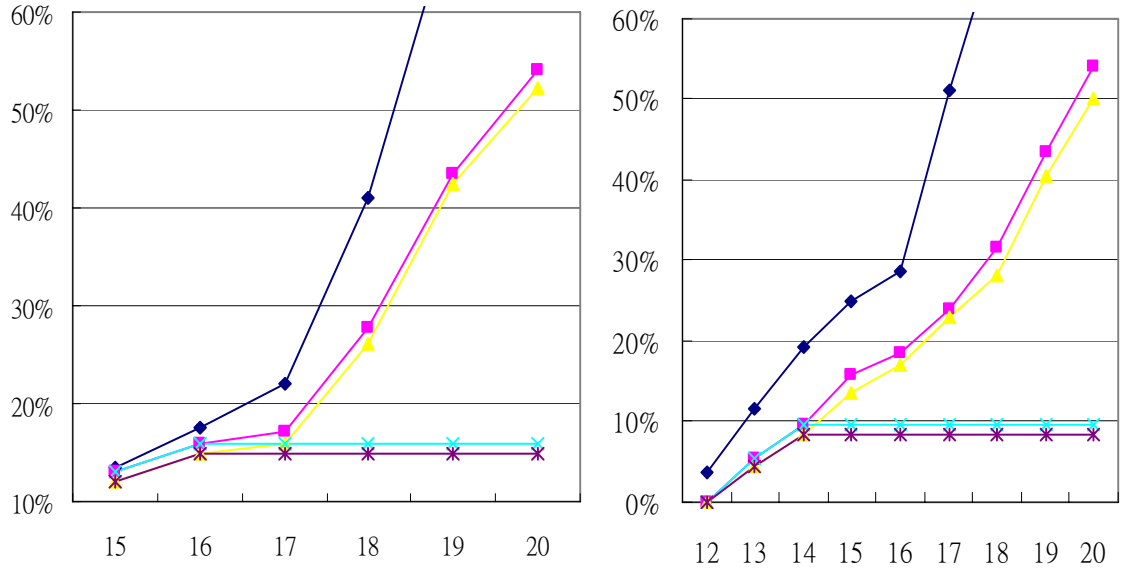

Figure 5-6: Enlarge – Packet drop rate (N_{VI}) (N_{VO} : N_{VI} = 1 : 1)

Figure 5-7, Figure 5-8 and Figure 5-9 indicate the packet drop rate. Original VI packet drop rate decrease rapidly when the loading is heavy. The Constant r and Variant r are more moderate than Original VI, because the Packet Drop mechanism makes more successful probability for packets in front of the queue. The delay of CAC Constant r and CAC Variant r are the smallest, resulting from CAC mechanism constrains the number of connections and guarantee the delay to reduce the probability of the dropped over delay packets.

5.3. Throughput

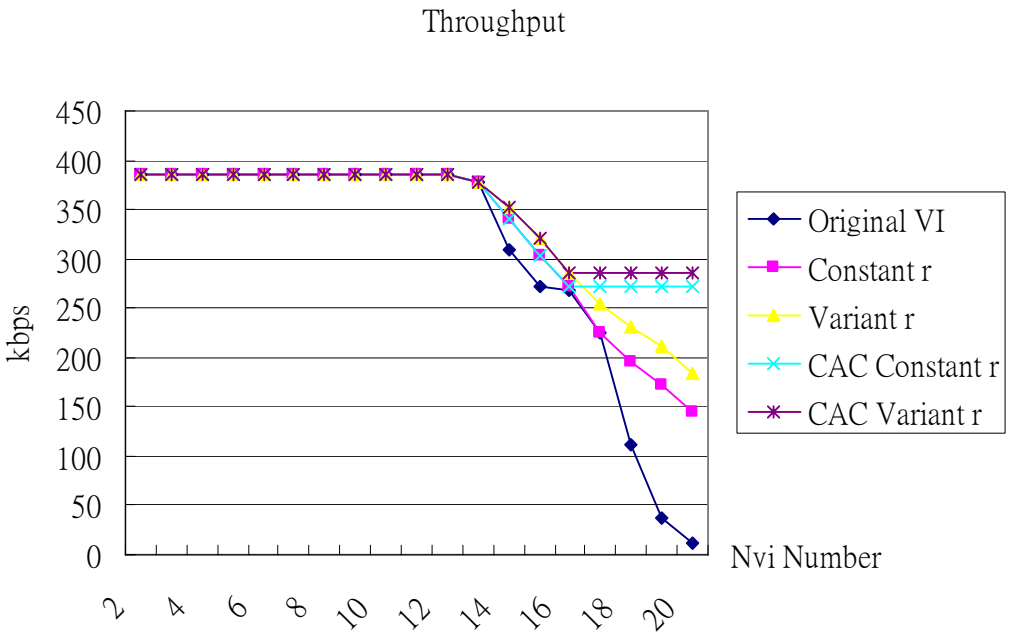

Figure 5-7: Scenario 1 – Throughput (N_{VI})

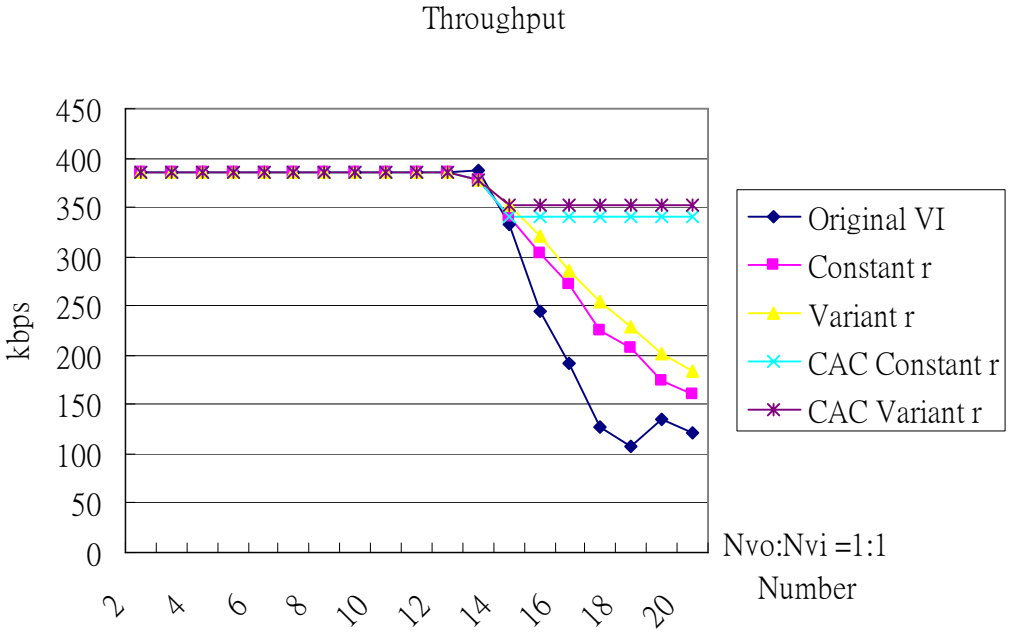

Figure 5-8: Scenario 2 – Throughput (N_{VO} : N_{VI} = 1 : 1)

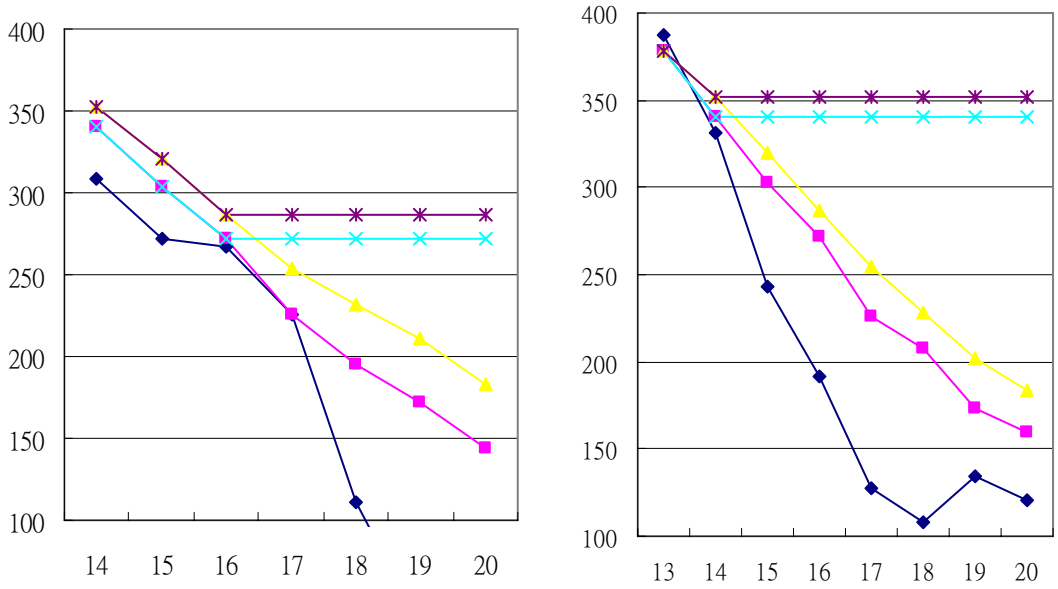

Figure 5-9: Enlarge – Throughput (N_{VI}) (N_{VO} : N_{VI} = 1 : 1)

It expresses the throughput in Figure 5-7, Figure 5-8 and Figure 5-9. Original VI throughput increase rapidly when the loading is heavy. The Constant r and Variant r are smoother than Original VI, because Token Bucket and Packet Drop mechanism lead the result. The throughput of CAC Constant r and CAC Variant r are the highest, resulting from CAC mechanism constrains the number of connections for guaranteeing the throughput.

.