

Network Topology

The following 6 cases are simulated to compare the QoS of Ethernet and WiFi in different circumstances. Some of the cases were designed purely to compare the difference of Ethernet and WiFi while other cases are an attempt to simulate real life situations.

Case 1: Equal User Number, Calgary to Vancouver

The first case is a simple test to see the difference between Ethernet and WiFi between Vancouver and Calgary. In both cases, 10 users in Vancouver and 10 in Calgary are setup for low quality video conferencing. The entire simulated time was 15 minutes

Case 2: Equal User Number, Toronto to Vancouver

Case 2 is set up exactly like case 1 except the office subnet is now placed in Toronto. The total user remained at 10 per office and the simulated time at 15 minutes.

Case 3: Unequal User Number, Calgary to Vancouver

The third case was done between Vancouver and Calgary. The total number of users remained at 20 but the users in each office varied. The first simulation repeated case 1 to be used as reference. Simulation two was with 5 Vancouver video conferencing users and 15 Calgary users. The last simulation had 15 users in Vancouver and 5 in Calgary. This case is the only case where the simulation time was shortened due to the computer system's limited memory.

Case 4: Mixed Network, Equal User Number

After assessing the basic qualities of simple Ethernet and WiFi networks, case 4 will evaluate the QoS of mixed networks. The simulation combines Ethernet with WiFi by adding a 10BaseT Ethernet Network to the router that is already connected to a WiFi access point. The referenced 10 user per office in the previous cases is split into 5 Ethernet users and 5 WiFi users in each office. The comparison in this case is made between the Vancouver-Calgary network and the Vancouver-Toronto setup. The simulation is set to 15 minutes.

Case 5: Mixed Network, Unequal User Number

Due to the large amount of combinations that can be created by changing the number of total users, the number of Ethernet/WiFi users at a particular location and the distance, case 5 will specifically analyze a mixed network between Calgary and Vancouver with varying user number. The first simulation is again the reference one with 5 WiFi and 5 Ethernet users in both subnets. In the next simulation, the number

of Ethernet users is increased to 9 in both subnets while the WiFi users were limited down to 1 user. The third simulation is similar except with 9 WiFi users and 1 Ethernet user.

Case 6: Extra Applications Added

OPNET 16.0 contains many common applications that can be added into the network traffic to simulate a more realistic model. The first simulation is again the reference result with 10 users in Vancouver and 10 in Calgary using only low quality video conferencing. Next, the search engine (medium load) and email (medium load) applications were added to the applications profile. The last simulation included the previous three applications and the addition of medium web browsing and medium FTP loads. The Ethernet, WiFi and combined networks are simulated separately. The three networks are later simulated together with only three applications added.