

ABSTRACT

Delay in the use of the 10 Gigabit Passive Optical Network (XG-PON) access network on the Centralized RAN (C-RAN) is not really good since a small maximum capacity of Baseband Units (BBU) and Remote Radio Heads (RRH) used, namely 2-8 units. Dynamic Bandwidth Allocation (DBA) is required on upstream PON to dynamically allocate bandwidth. Conventional DBA on XG-PON produces an upstream delay which is 0.6 ms at least. In fact, C-RAN has strict delay requirements, namely 0.3 ms, which is why a DBA with low delay is needed as a solution to be applied to C-RAN. In addition, to increase the maximum capacity of C-RAN, a mobile fronthaul Next-Generation Passive Optical Network 2 (NG-PON2) is implemented which can produce a maximum capacity greater than XG-PON.

In this study, a modified Round Robin DBA algorithm is proposed with consideration of delay performance in upstream, namely by utilizing excess bandwidth and using forecasting methods. Other considerations taken in this study include throughput parameters, and Packet Delivery Ratio (PDR), as well as the study of the maximum Remote Radio Heads (RRH) and Optical Line Terminal (ONT) that can be aggregated using NG-PON2.

Modified Round Robin DBA has the best upstream delay among other DBAs that can be applied to C-RAN using a maximum of 16 Optical Network Unit (ONU) at a distance of 10 km with the result of 0.261 ms. The NG-PON2 as an access network contributes to increasing the maximum RRH and ONT capacity in the C-RAN system.

Keywords: C-RAN, NG-PON2, Dynamic Bandwidth Allocation, Delay.