

# Slotted Aloha

20<sup>th</sup> March 2017

## OBSERVATIONS

Two sets of observations were made, one which allows a maximum of 10 transmission attempts per packet (as per the problem statement), and another allowing around 10000 transmission attempts per packet before forceful termination.

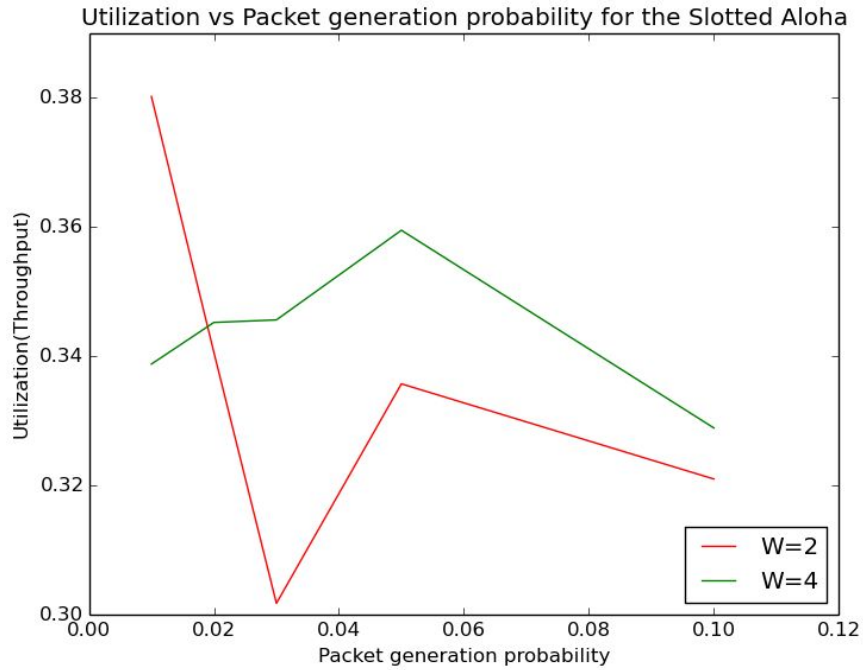
In the first case, due to frequent collisions, the operation was terminated before MAX\_PACKETS could be sent. This resulted in the utilization being computed only over a small number of packets, which resulted in a high variability in results on every execution.

In the second case, the results had much less variance, and the maximum utilization obtained was around 36%-38%. This matches the theoretical maximum of 36%. The theoretical maximum of 36% was computed under the assumption that the number of nodes in the network is very large (tending to infinity) whereas we are only dealing with around 50 nodes in our experiments. So increasing the number of nodes may give more accurate results.

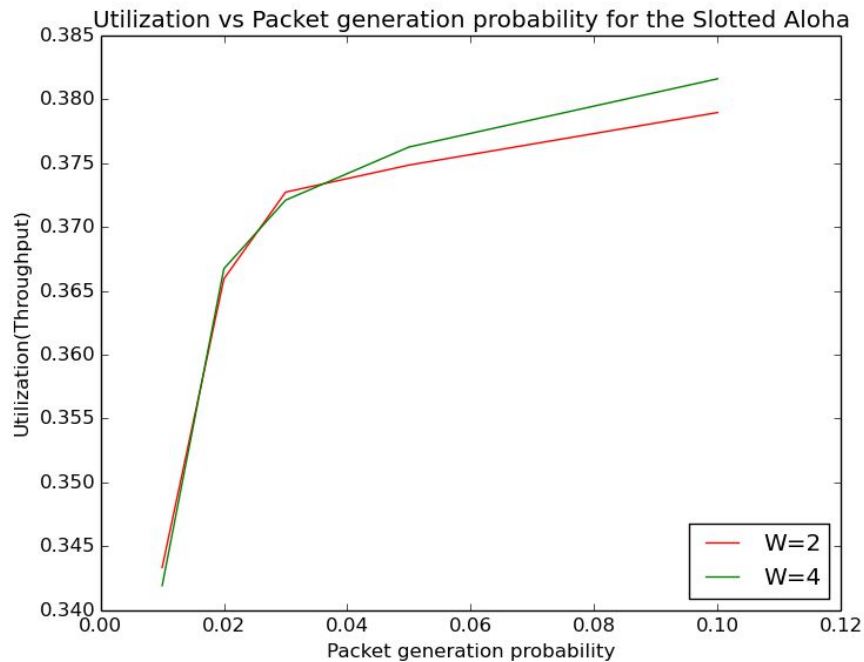
Another experiment was carried out, this time by changing the number of nodes to 1000. The results obtained are also stated below. This experiment was performed in order to evaluate the behaviour of the SlottedAloha implementation when the number of nodes is very high. This was performed with a different range of packet generation probabilities.

## GRAPHS

Case 1: Maximum retransmission attempts : **10**; N = 50, Max Packets = 10000



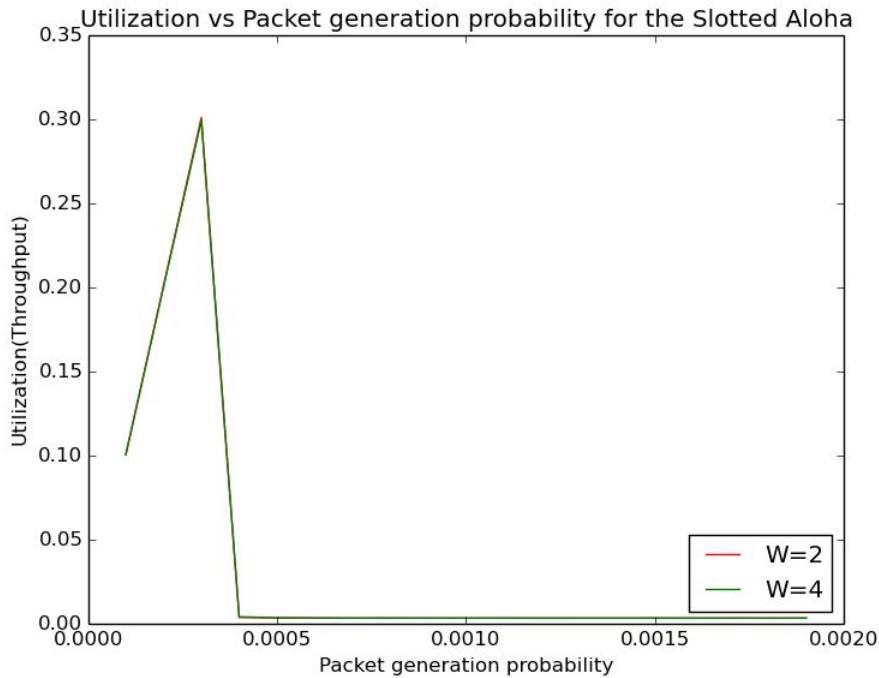
Case 2: Maximum retransmission attempts : **10000**; N = 50, Max Packets = 10000



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Case 3: Number of nodes, **N = 1000**, Max. retransmission attempts: 10000, Max packets = 10000

The graph was plotted over a different range of packet generation probabilities.



Case 4: Number of nodes, **N = 100**, Max retransmission attempts: 1000, Max packets = 10000, Range of probability values = 0.001 to 0.1 at steps of 0.001

