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Assigmnent 3

INF5040 - Open distributed processing

Autumn semester 2017

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1. OBSERVATION

1.1 RING

1.1.1 Clustering information

The clustering information tells us about how the nodes are distributed and connected each other. Lower this value is, better our peer is distributed.
If the value is too high, the system might separate the peer network into different parts e.g. some nodes will not be able to communicate each other.

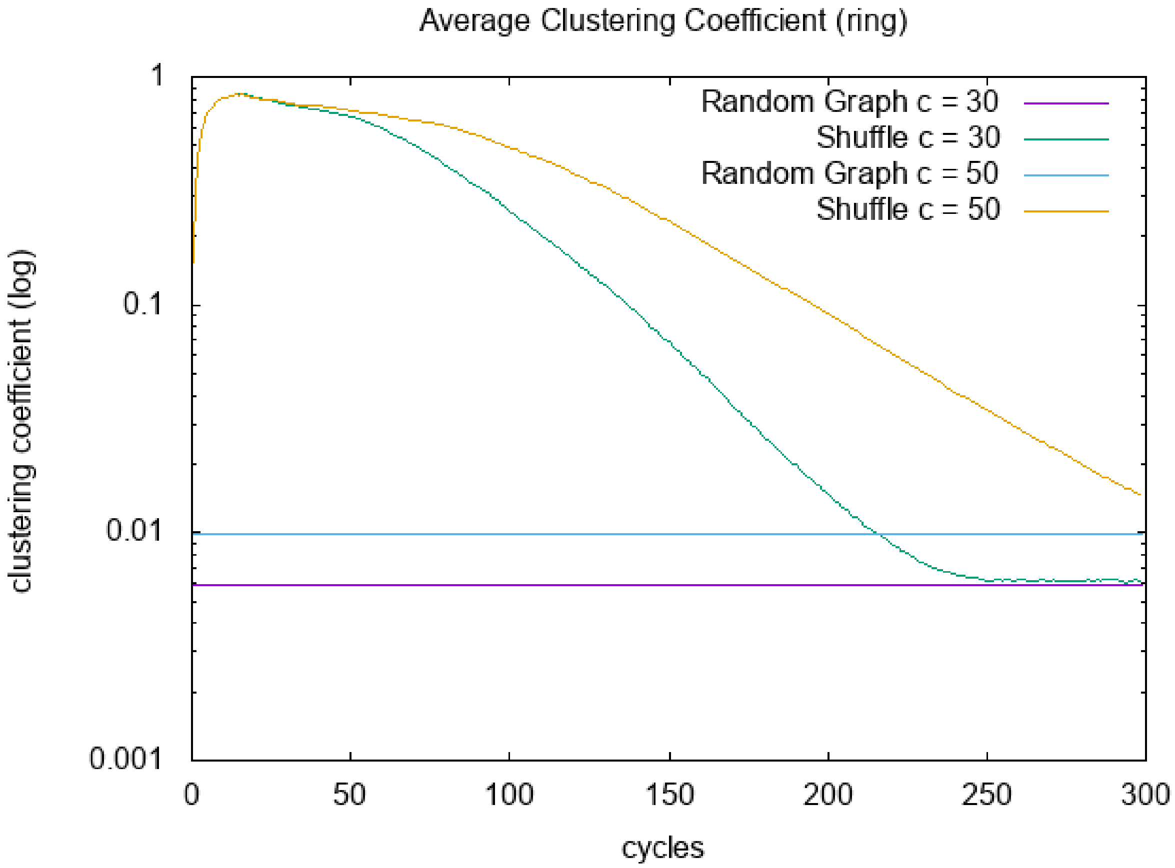

Figure 1: average clustering coefficient with ring topology

First, we can see that our Basic Shuffle algorithm converge to the random distribution. We can notice that with smaller we converge faster than a bigger cache. The reason might be that it is easier to shuffle a small cache.
Besides, with the smaller cache, we get a better clustering rate.

1.1.2 Average path length

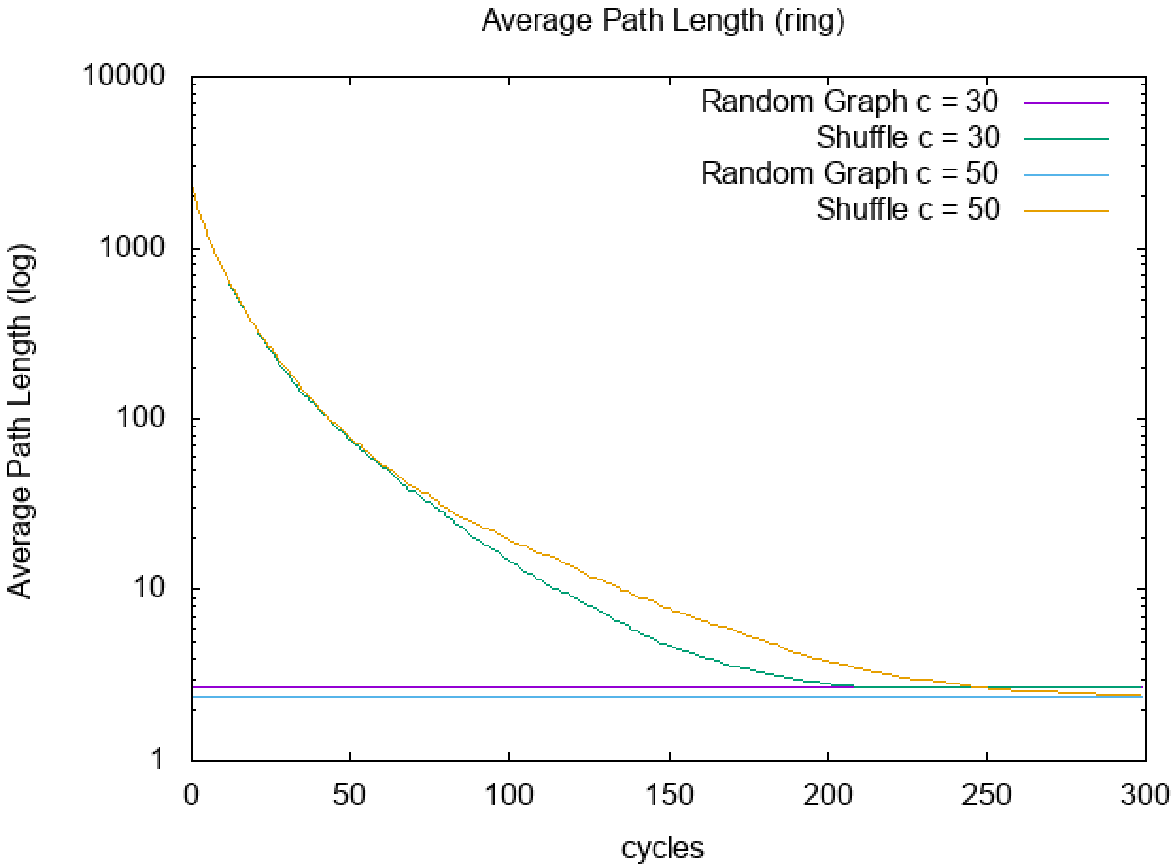

Figure 2: average path length with ring topology

Like the clustering information, the average path of the Basic Shuffle algorithm converges to the random distribution.

With a smaller cache, we converge faster than a bigger cache. However, after 100 cycles we get a smaller average path with the 50-size-cache.

1.1.3 In-degree

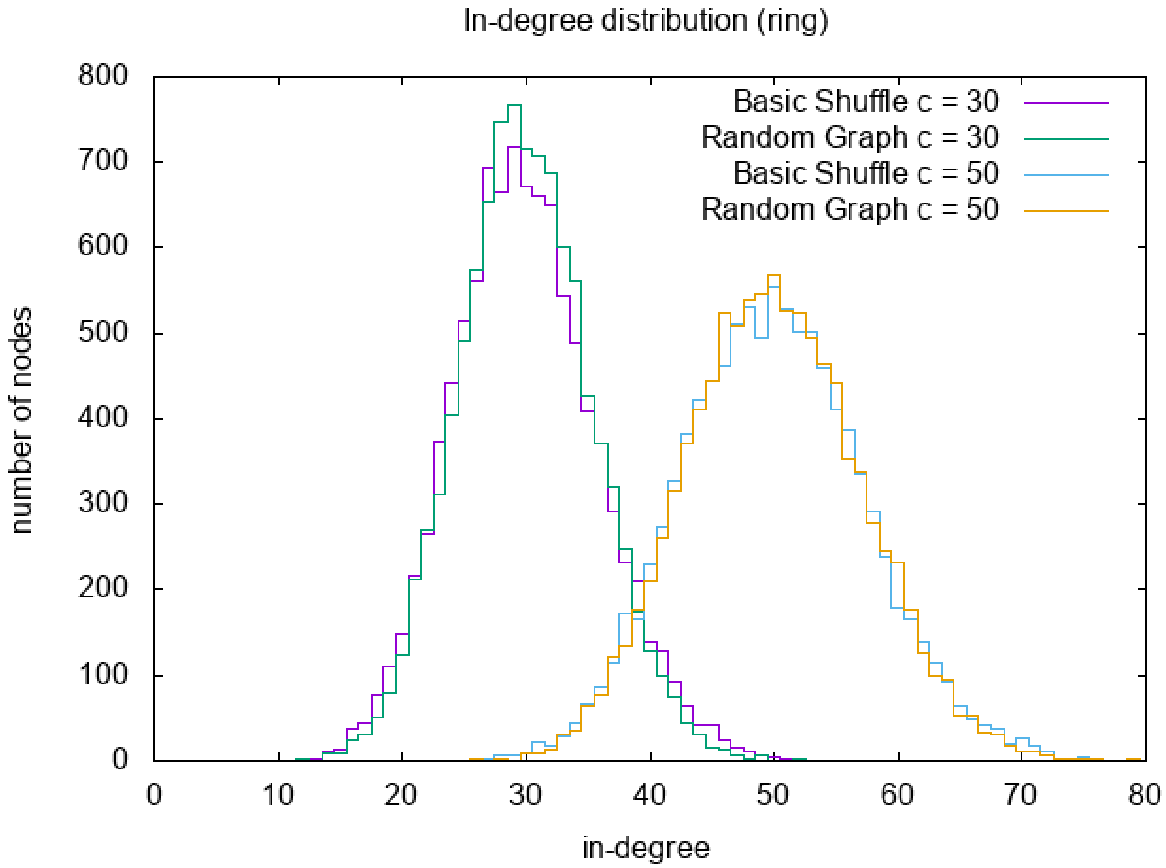

Figure 3: in-degree distribution with ring topology

At the end of the simulation, we obtain approximately the same values than the random distribution. This is a good thing because it means that our nodes are randomly distributed.

We can notice that the size of the cache corresponds to the peak of the curve. This can be a useful information for building a distributed application.

1.2 STAR

1.2.1 Clustering information

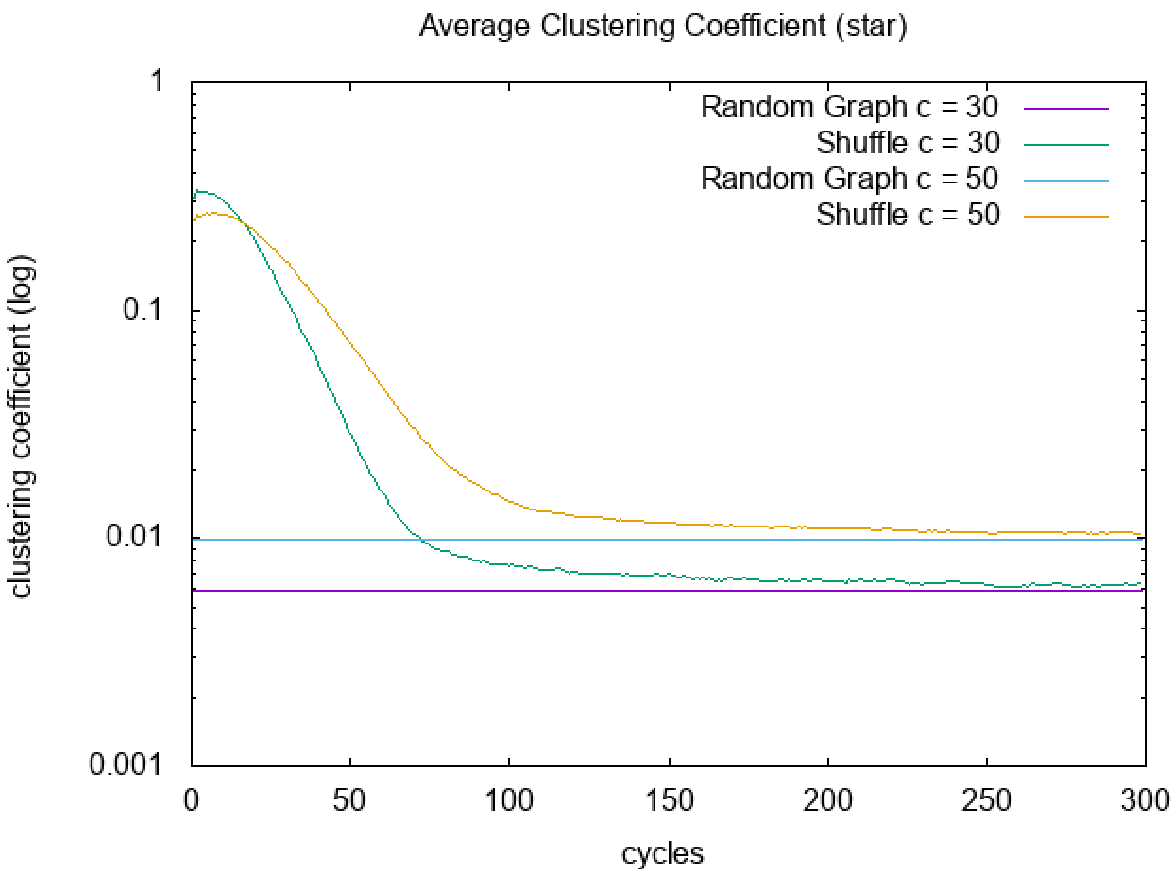

Figure 4: average clustering coefficient with star topology

Like the ring topology, the clustering coefficient reach the random clustering coefficient.

1.2.2 Average path length

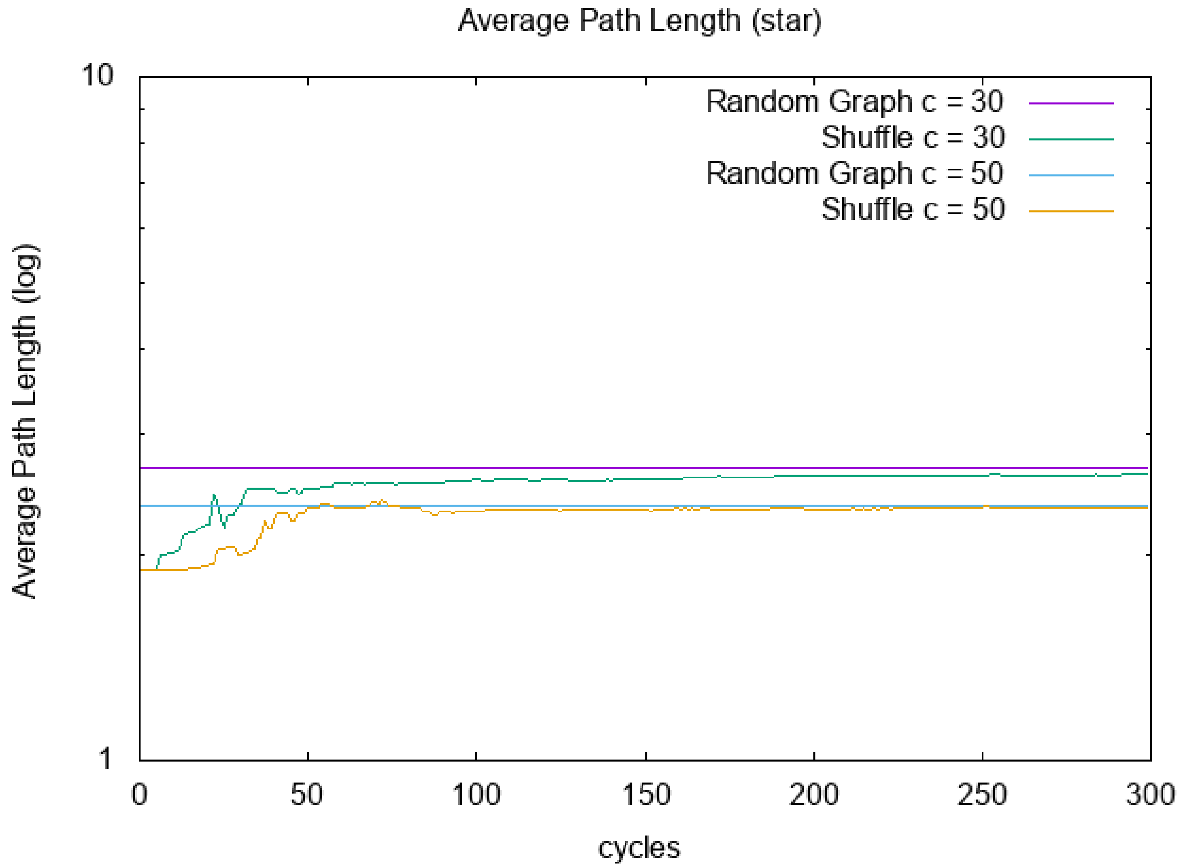

Figure 5: average path length with star topology

Like the ring-based, we converge random distribution. Whatever the size cache, we converge in the same way.

We can add that at the beginning of the simulation, the average path was better and slowly increase to the random average path.

1.2.3 In-degree

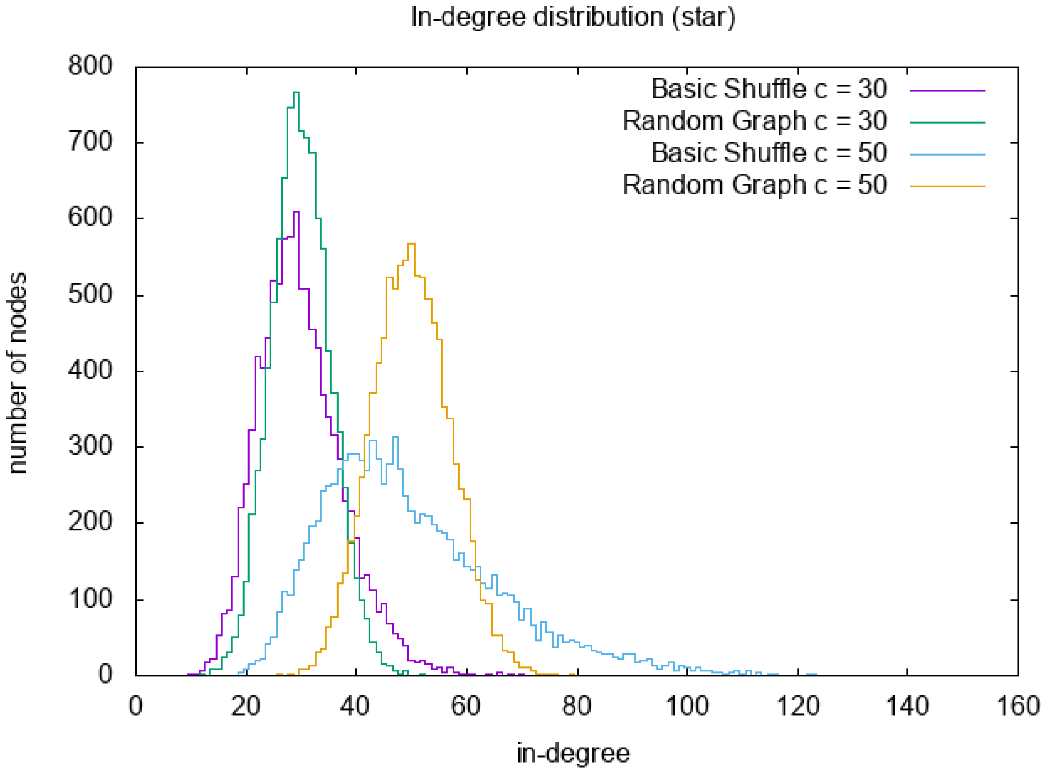

Figure 6: in-degree distribution with star topology

The in-degree distribution does not fit well with the random in degree distribution. The effect increases with the cache size.
More the cache size increase, more the in-degree distribution is spread.

2. CONCLUSION

To conclude, star topology initialisation provides a better result on the first half on the simulation. In fact, the average path with star is lower than with ring. Besides, the cluster coefficient decreases faster with star topology.
However, the ring topology perform better during the end of the simulation. In fact, both star and ring topology provide the same result in terms of average path and clustering coefficient. However, the in-degree distribution for the ring topology is less spread than star topology.

After a while, we made ring topology as a random distribution.

So, why we should not use random distribution? Because random distribution is fixed and does not support the move of peers.