IDA Gossip Experiment Results

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Experimental Setup

4096 process deployed on 32 machines—128 process per machine—from Gros cluster(G5K). The bandwidth of each process capped at 20Mbps(Upload Bandwidth). One way latency of 15ms added to each communication link(RTT is 30ms).

In this set of experiments, a large message—2MB— chunked in to 128 chunks and disseminated over different number of sources usin IDA gossip. 1 source means that the full message is disseminated by the single source. 2 source means that the message disseminated over 2 source each disseminate 64 chunks.

Each experiment run for 120 rounds to collect enough data.

A rounds ends for a node when it collects all of the 128 chunks disseminated in that round. At the end of a round, a node calculates a sleep time and sleeps. ***The sleep time is implemented to see the best possible performance of the IDA gossip.***

Currently, IDA gossip implementation does not add redundancy chunks because the number of redundancy chunks are calculated according to the percentage of faulty nodes in the system.

Currently, we have measured 3 metrics:

- First Chunk Delivery Time (ms)
- Message Delivery Time (ms)
- Queue Length

First Chunk Delivery Time is the measure of how early a node can contribute to the dissemination, and the smaller value is desirable. Message Delivery Time is the time needed to collect all 128 chunks disseminated for that round. Each message contains a time field, and this field is used to calculate elapsed time by a node. Queue length is the average number of messages on peers waiting to be forwarded. Queue length could be the precursor of contention: chunks are competing for the same resources and queue size could be helpful to understand the extend of this contention.

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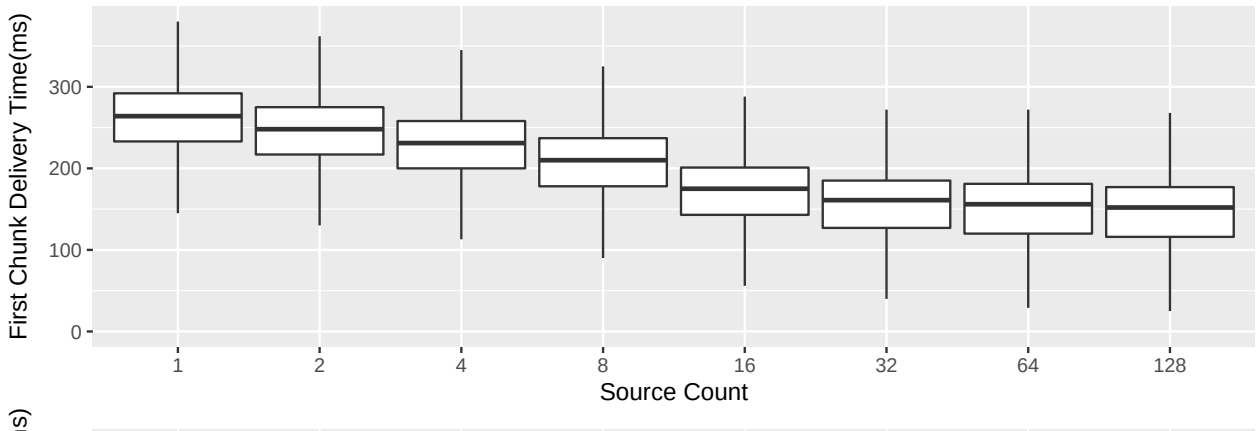
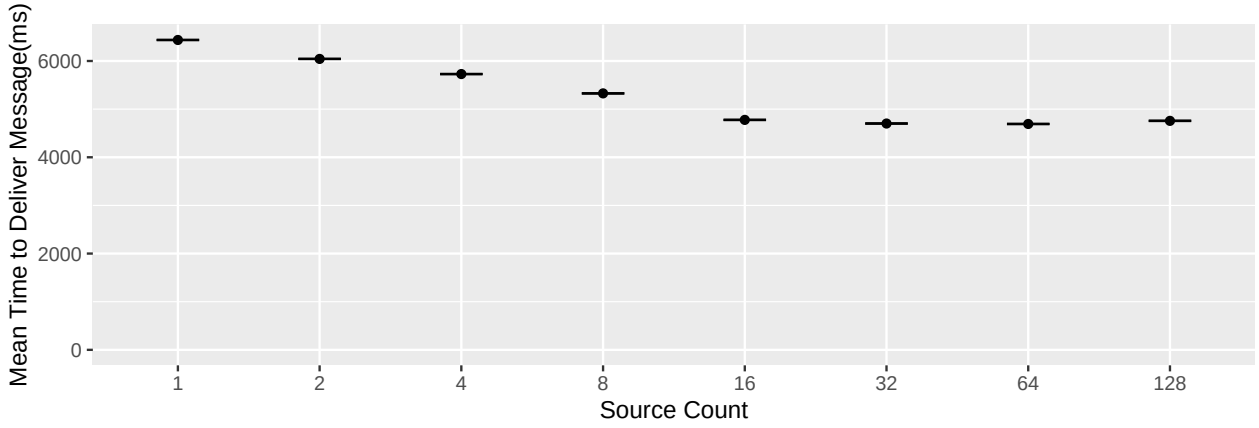

First Chunk Delivery Time(ms)
300
200
100
0
1
2
4
8
16
32
64
128
Source Count


Mean Time to Deliver Message(ms)
6000
4000
2000
0
1
2
4
8
16
32
64
128
Source Count

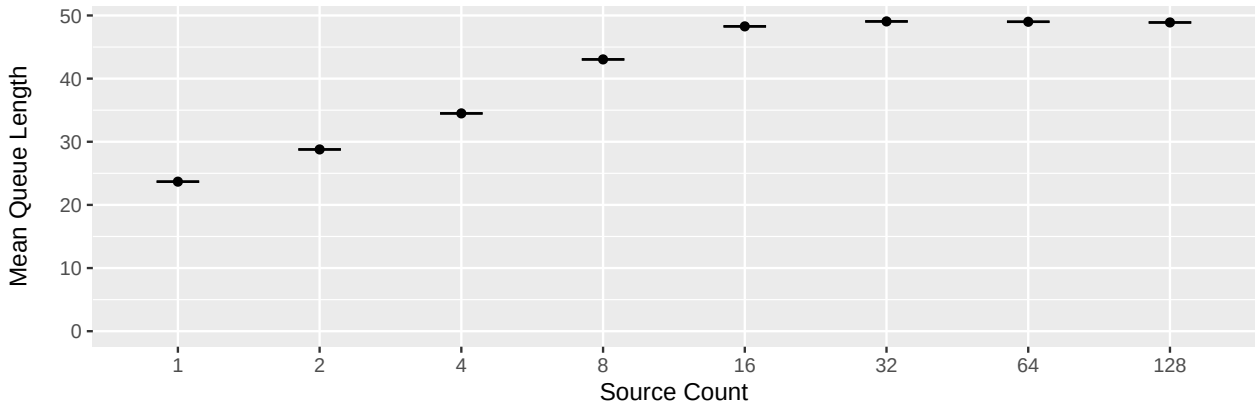

Mean Queue Length
50
40
30
20
10
0
1
2
4
8
16
32
64
128
Source Count

Table 1: First Chunk Delivery Time(ms)

SourceCount	Min	FirstQuartile	Median	ThirdQuartile	Max
1	145	233	264	292	380
2	130	217	248	275	362
4	113	200	231	258	345
8	90	178	210	237	325
16	56	143	175	201	288
32	40	127	161	185	272
64	29	120	156	181	272
128	25	116	152	177	268

Table 2: Mean Message Delivery Time(ms)

SourceCount	LowerBound	Mean	UpperBound
1	6435.539	6436.787	6438.036
2	6041.729	6043.213	6044.697
4	5727.166	5728.873	5730.579
8	5325.216	5327.359	5329.503
16	4773.979	4776.755	4779.531
32	4698.516	4701.435	4704.353
64	4689.079	4691.933	4694.788
128	4754.030	4756.831	4759.631

Table 3: Queue Length

SourceCount	LowerBound	Mean	UpperBound
1	23.66894	23.68152	23.69411
2	28.77059	28.78567	28.80075
4	34.47373	34.49199	34.51024
8	43.02262	43.04264	43.06265
16	48.25395	48.27366	48.29338
32	49.03972	49.05880	49.07788
64	48.98367	49.00296	49.02226
128	48.87333	48.89198	48.91063