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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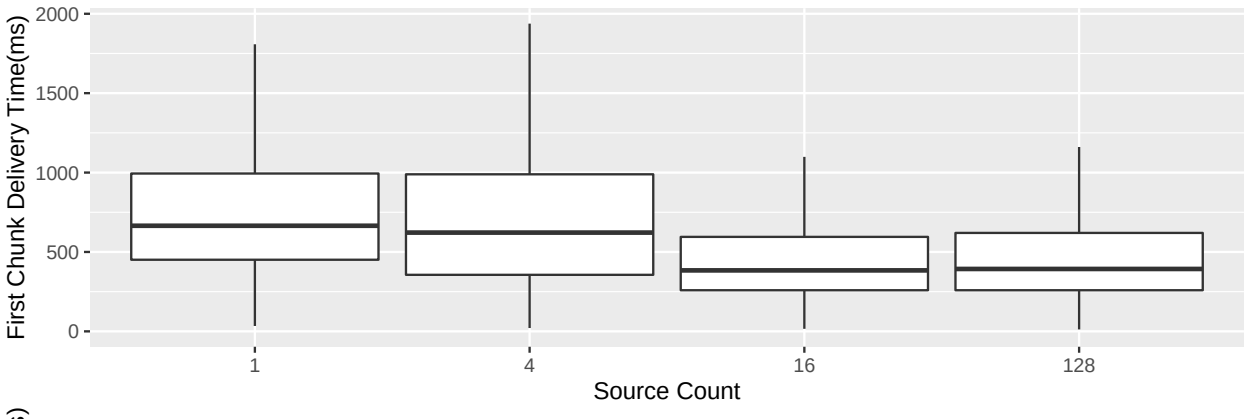
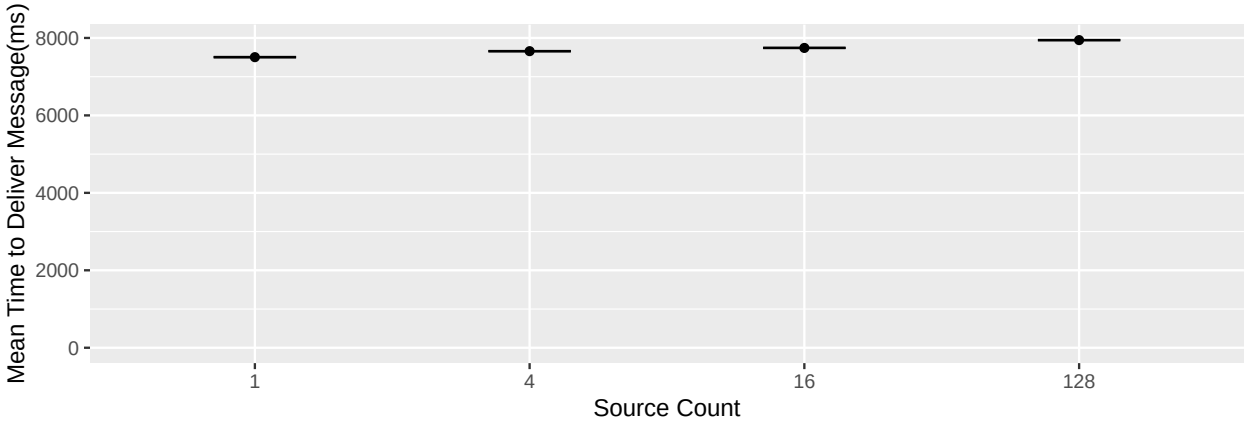

First Chunk Delivery Time(ms)
2000
1500
1000
500
0
1
4
16
128
Source Count


Mean Time to Deliver Message(ms)
8000
6000
4000
2000
0
1
4
16
128
Source Count

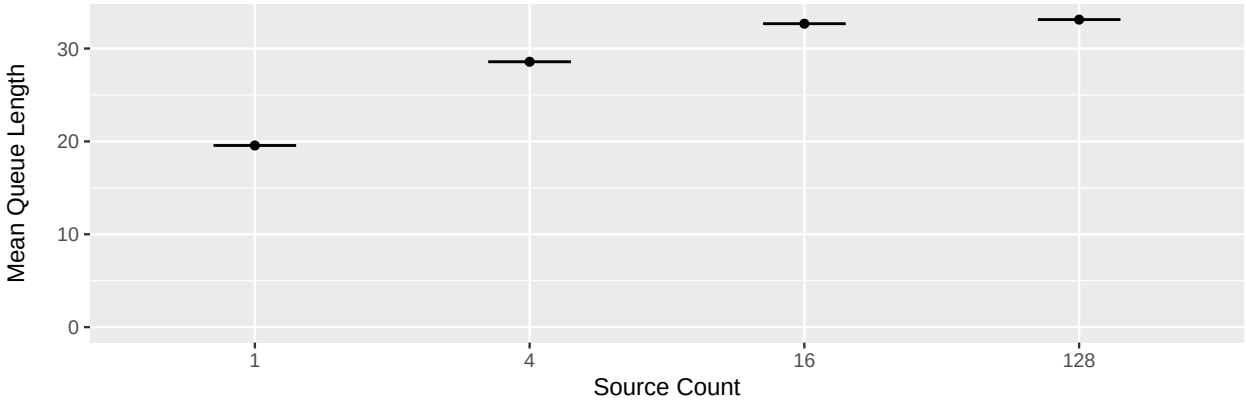

Mean Queue Length
30
20
10
0
1
4
16
128
Source Count

Table 1: First Chunk Delivery Time(ms)

SourceCount	Min	FirstQuartile	Median	ThirdQuartile	Max
1	34	451	665	994	1808
4	21	356	622	989	1938
16	16	259	384	595	1099
128	12	259	393	620	1161

Table 2: Mean Message Delivery Time(ms)

SourceCount	LowerBound	Mean	UpperBound
1	7500.521	7504.135	7507.749
4	7655.920	7658.757	7661.594
16	7740.217	7742.645	7745.074
128	7941.901	7944.469	7947.036

Table 3: Queue Length

SourceCount	LowerBound	Mean	UpperBound
1	19.54392	19.56266	19.58139
4	28.54654	28.57614	28.60575
16	32.64835	32.67264	32.69693
128	33.08848	33.11412	33.13976