

Empirical Check of Machine Homogeneity on Timing Protocol

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1 Description

In this work we do a check to see if the result on the same experiment is different on different nodes, each with the same machine specification.

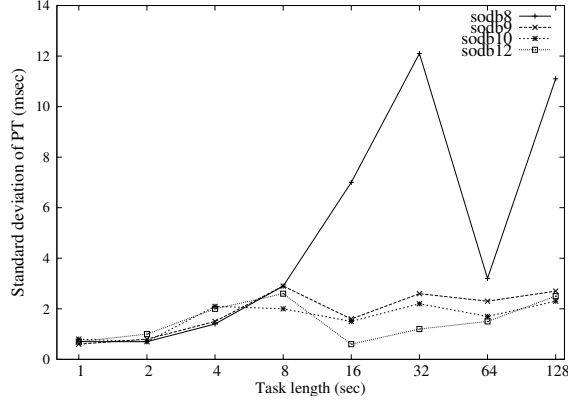
2 Experiment Notes

We provide a short description of our experimental runs. In these experiments we used four nodes (`sodb8`, `sodb9`, `sodb10`, and `sodb12`) in the same cluster.

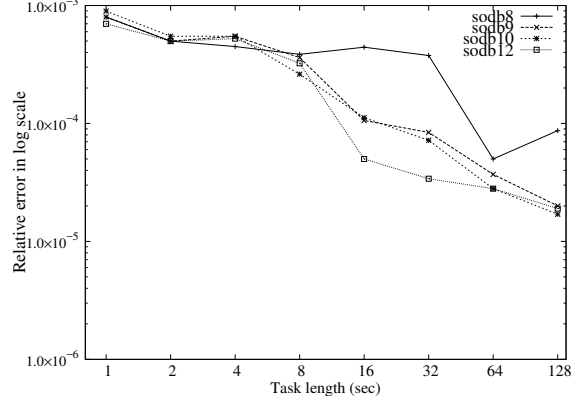
Machine	Task Length	Description	Time Length
<code>sodb8</code>	INC1~INC128	Runs of 300 samples	2017-02-09 ~ 2017-02-10
<code>sodb9</code>	INC1~INC128	Runs of 300 samples	2017-02-09 ~ 2017-02-10
<code>sodb10</code>	INC1~INC128	Runs of 300 samples	2017-02-09 ~ 2017-02-10
<code>sodb12</code>	INC1~INC128	Runs of 300 samples	2017-02-09 ~ 2017-02-10

Table 1: Detailed description of INC data used for histograms

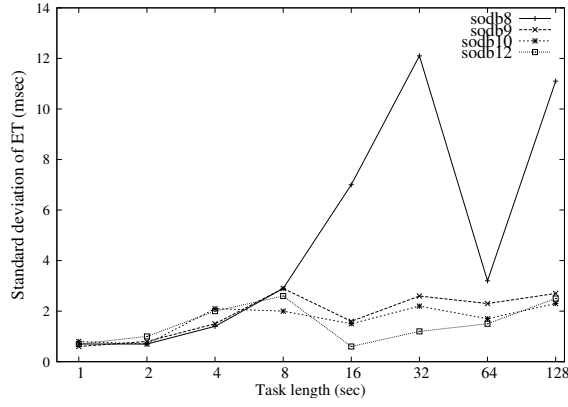
Measurement Quality Across the SoDB Nodes: Fig. 1 shows the standard deviation and relative error of elapsed time (ET) and process time (PT) on the different SoDB nodes as the task length of INC increases.



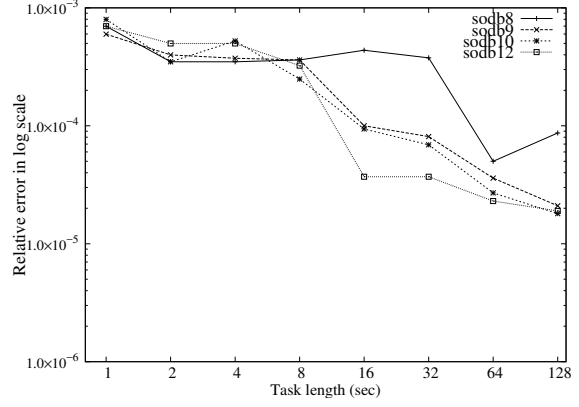
(a) Standard Deviation - ET



(b) Relative Error - ET



(c) Standard Deviation - PT



(d) Relative Error - PT

Figure 1: Measurement Quality Comparison among Different SoDB Machines

Each of the following sections exhibits histograms of ET and PT over increasing INC's task lengths on each individual node.

3 sodb8

This section exhibits histograms on the EMPv5 data obtained on `sodb8`. The detailed description of the base data are from Table 1.

3.1 ET

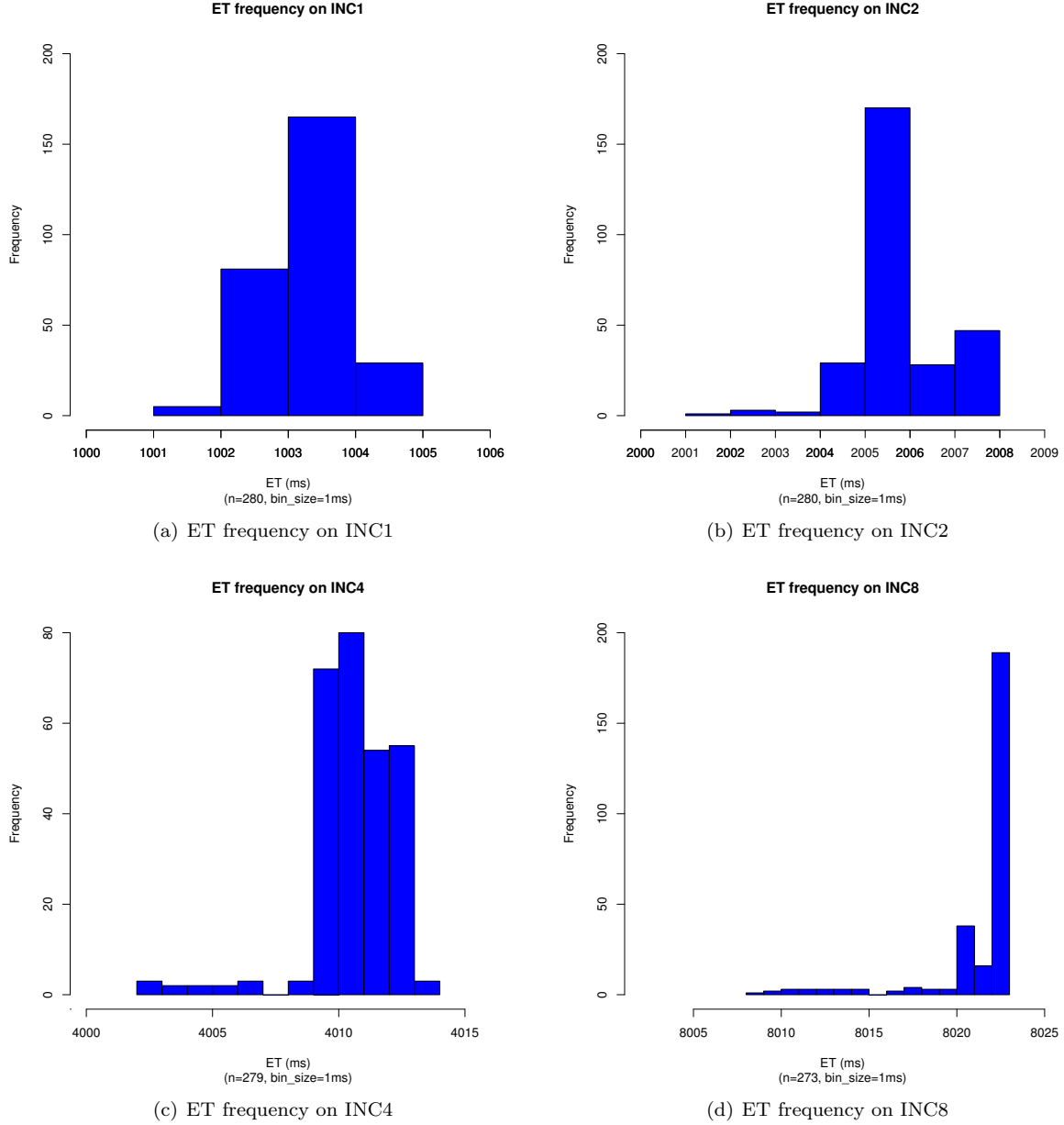
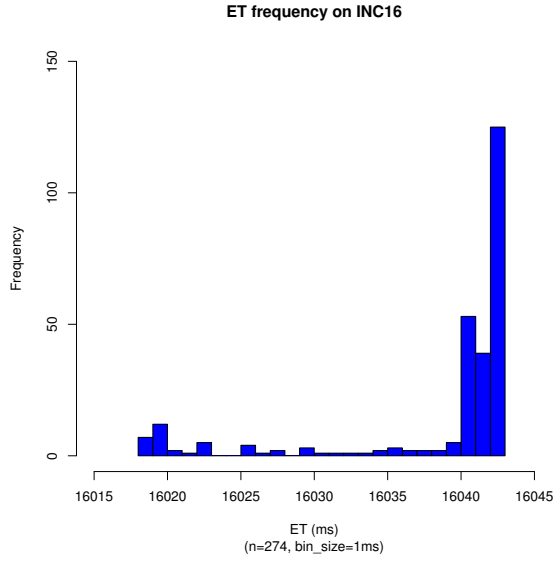
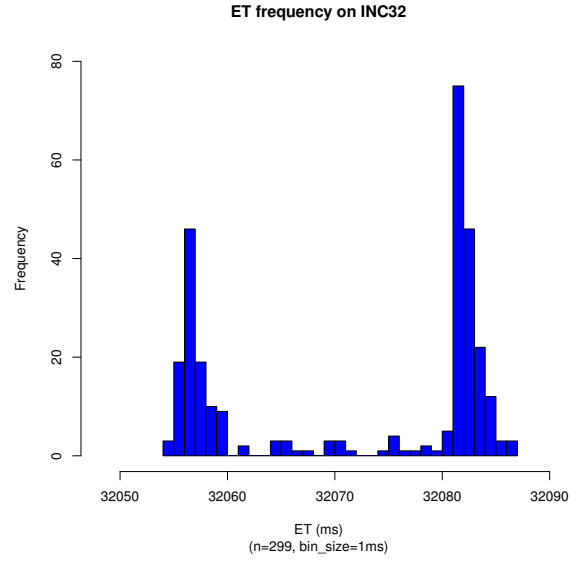


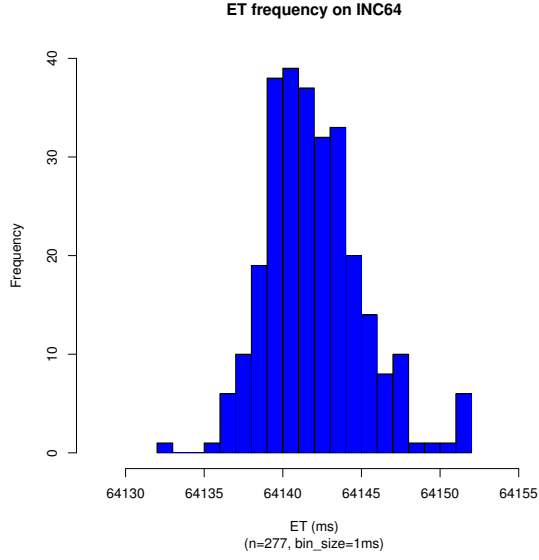
Figure 2: ET Histograms of INC1 ... INC8



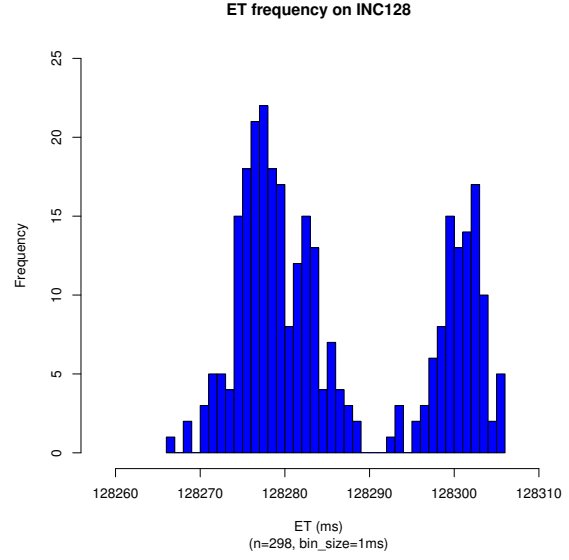
(a) ET frequency on INC16



(b) ET frequency on INC32



(c) ET frequency on INC64



(d) ET frequency on INC128

Figure 3: ET Histograms of INC16 ... INC128

3.2 PT

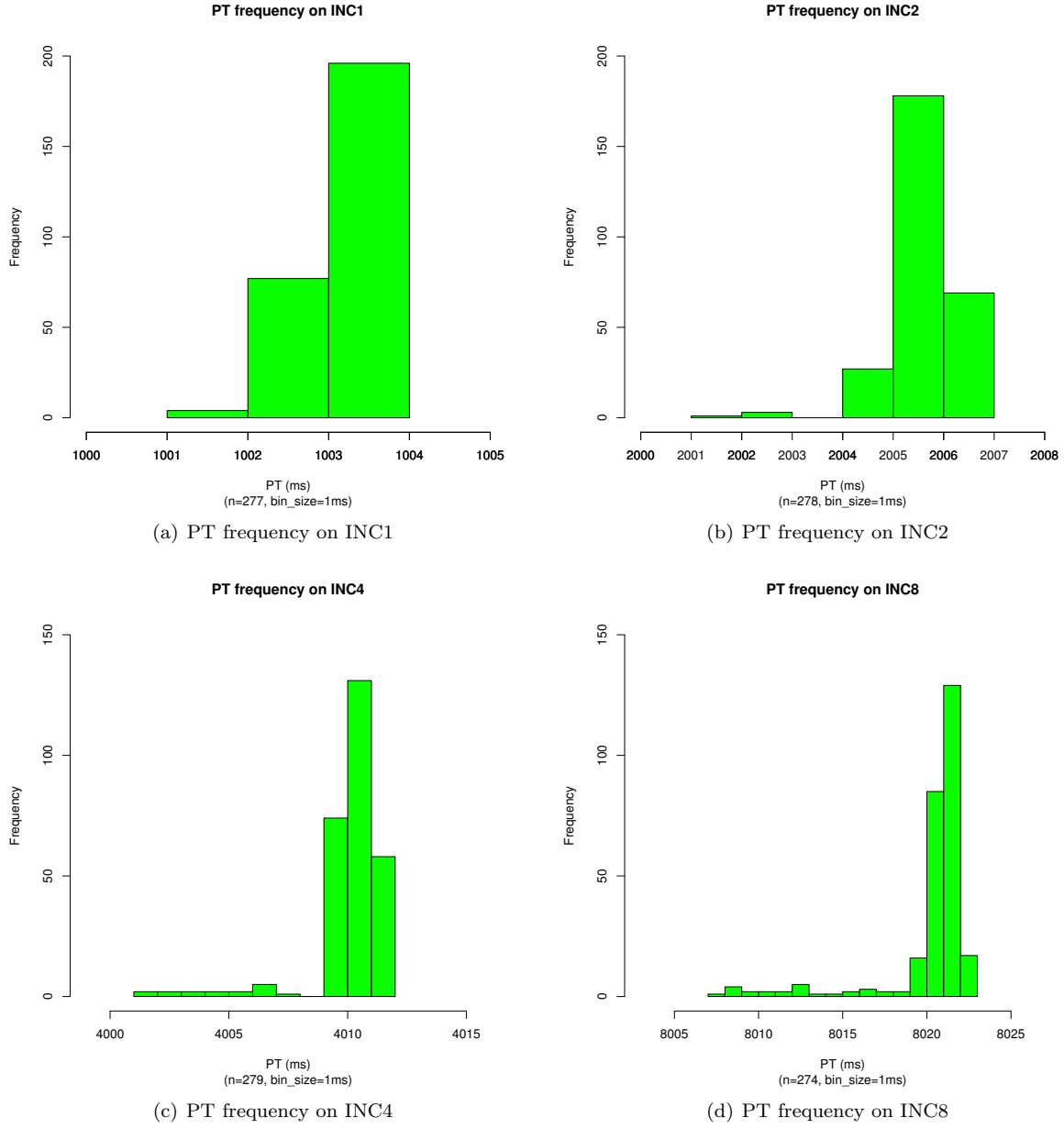
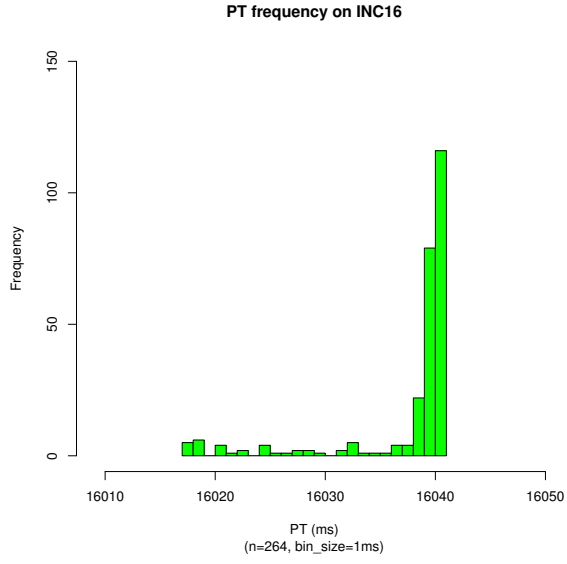
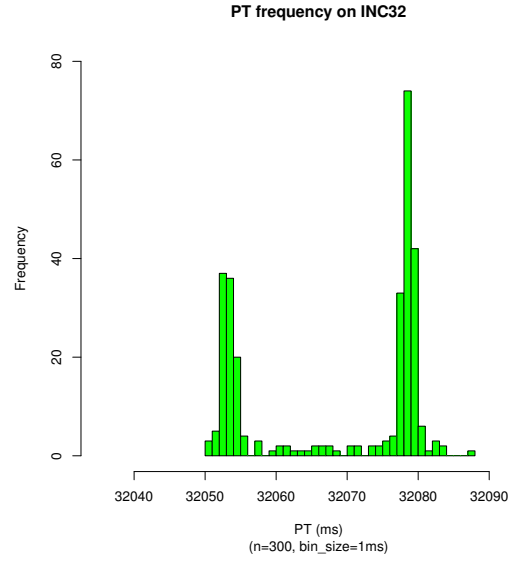


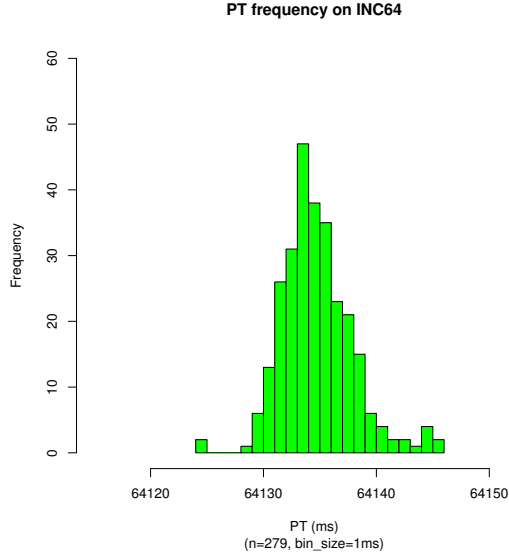
Figure 4: PT Histograms of INC1 ... INC8



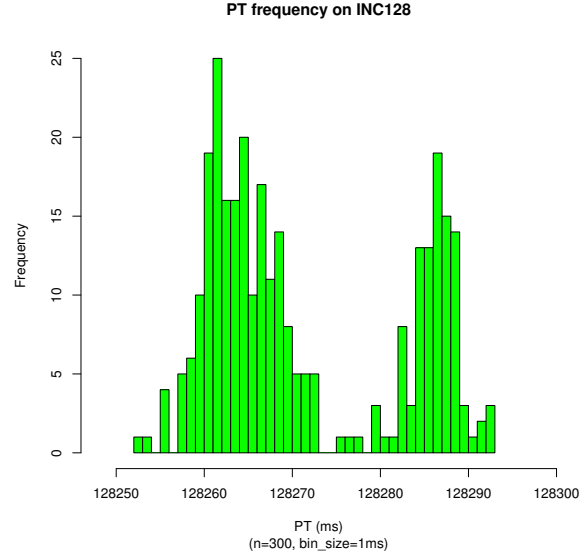
(a) PT frequency on INC16



(b) PT frequency on INC32



(c) PT frequency on INC64



(d) PT frequency on INC128

Figure 5: PT Histograms of INC16 ... INC64

4 sodb9

This section exhibits histograms on the EMPv5 data obtained on `sodb9`. The detailed description of the base data are from Table 1.

4.1 ET

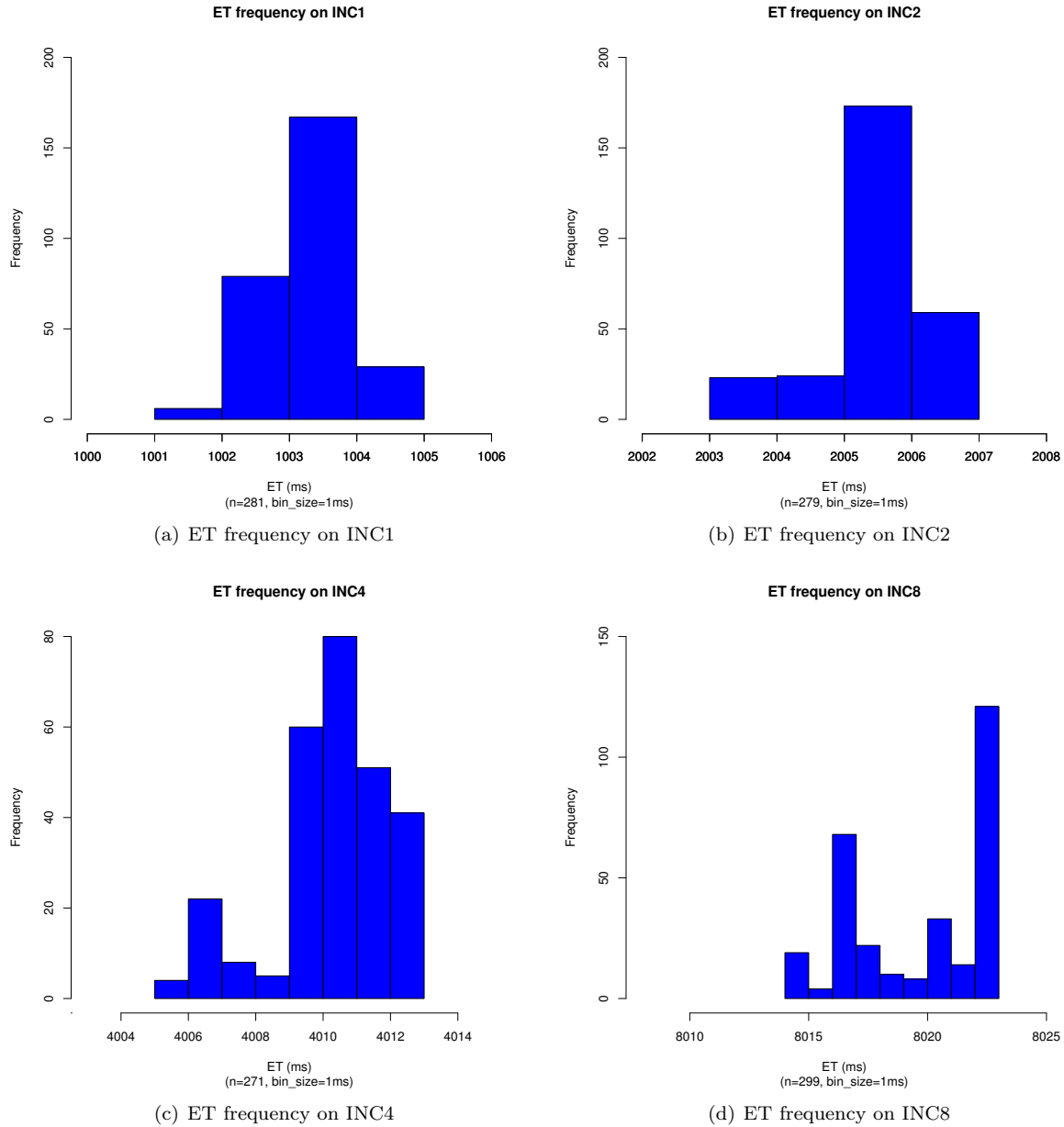
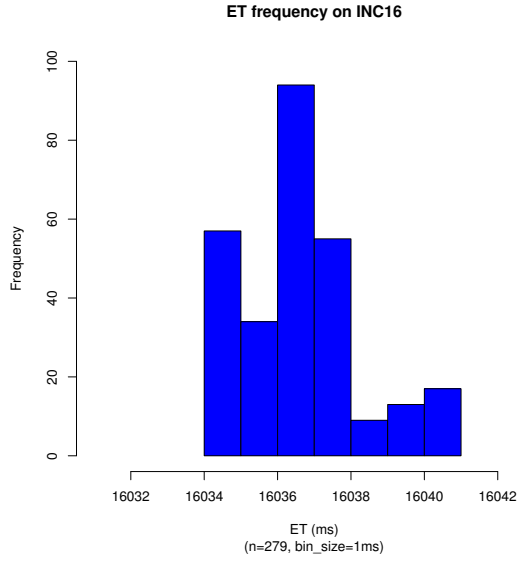
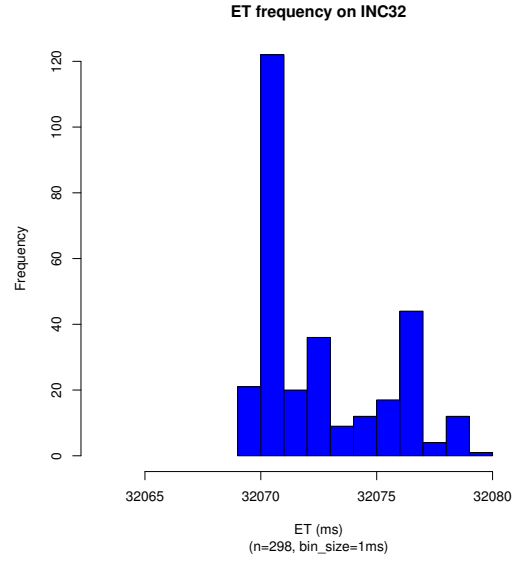


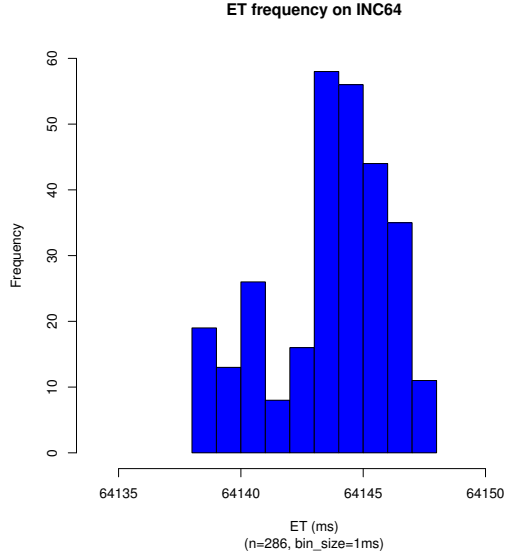
Figure 6: ET Histograms of INC1 ... INC8



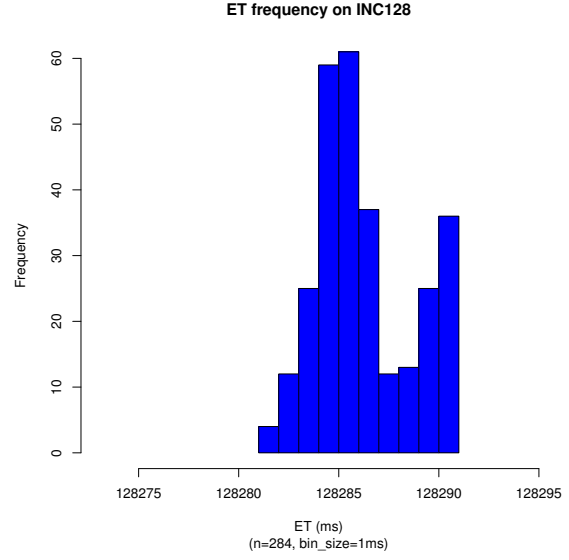
(a) ET frequency on INC16



(b) ET frequency on INC32



(c) ET frequency on INC64



(d) ET frequency on INC128

Figure 7: ET Histograms of INC16 ... INC128

4.2 PT

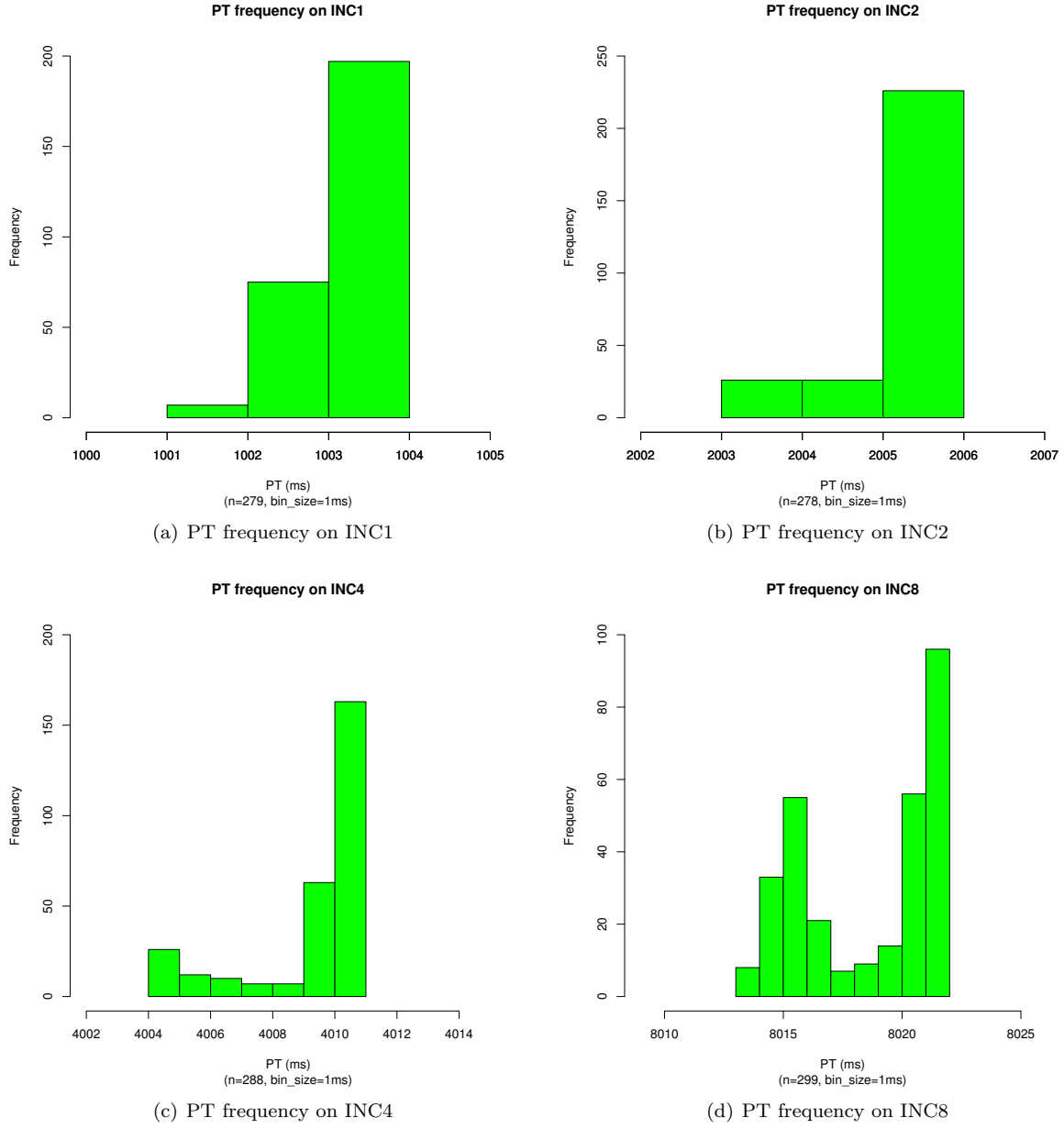
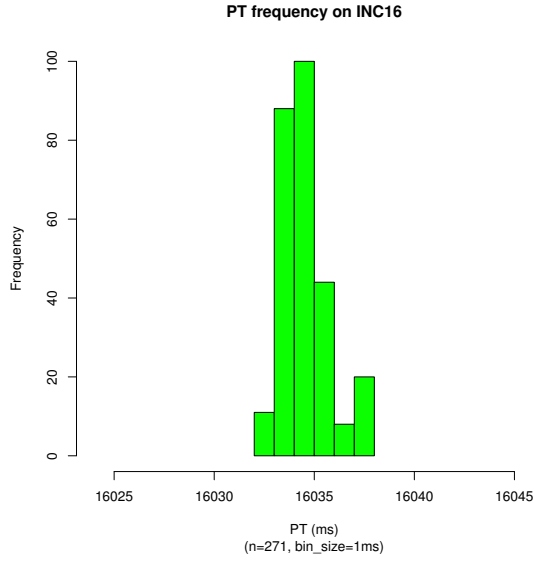
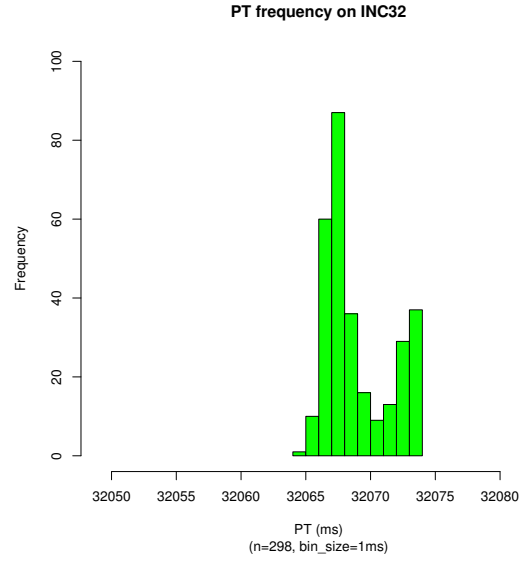


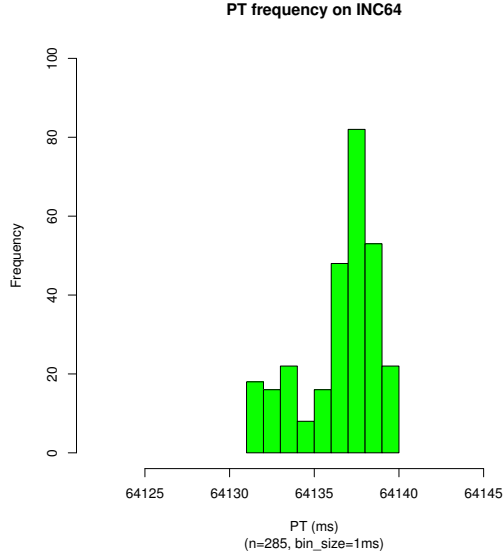
Figure 8: PT Histograms of INC1 ... INC8



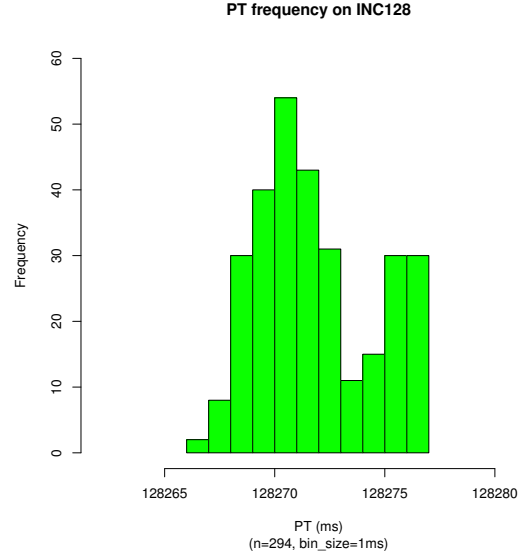
(a) PT frequency on INC16



(b) PT frequency on INC32



(c) PT frequency on INC64



(d) PT frequency on INC128

Figure 9: PT Histograms of INC16 ... INC64

5 sodb10

This section exhibits histograms on the EMPv5 data obtained on `sodb10`. The detailed description of the base data are from Table 1.

5.1 ET

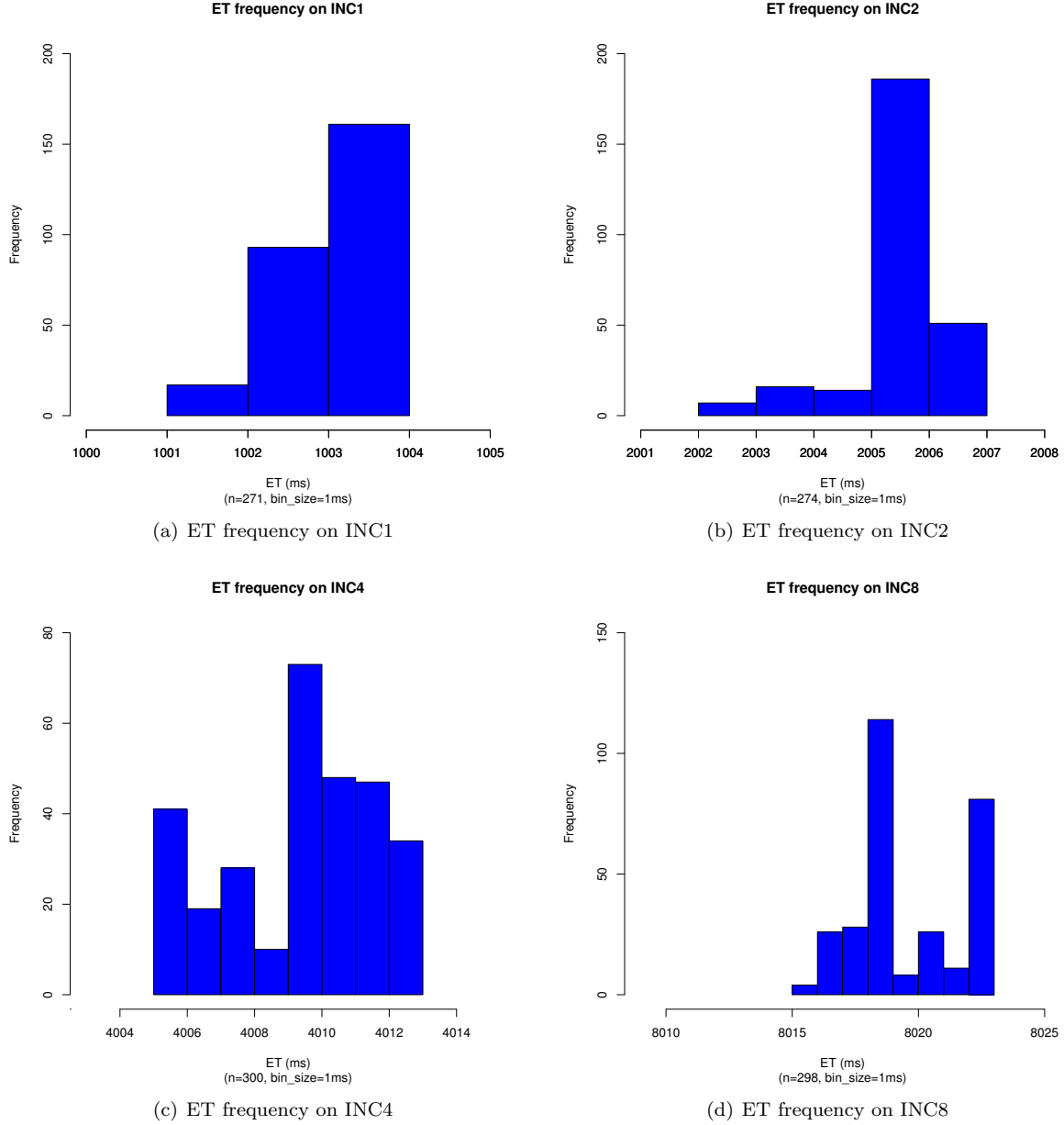
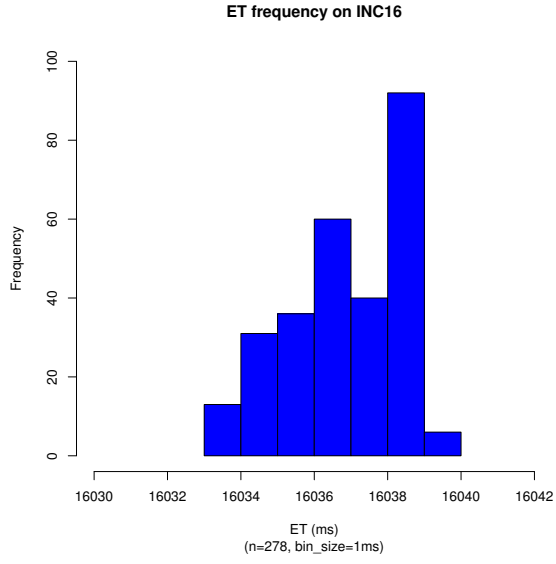
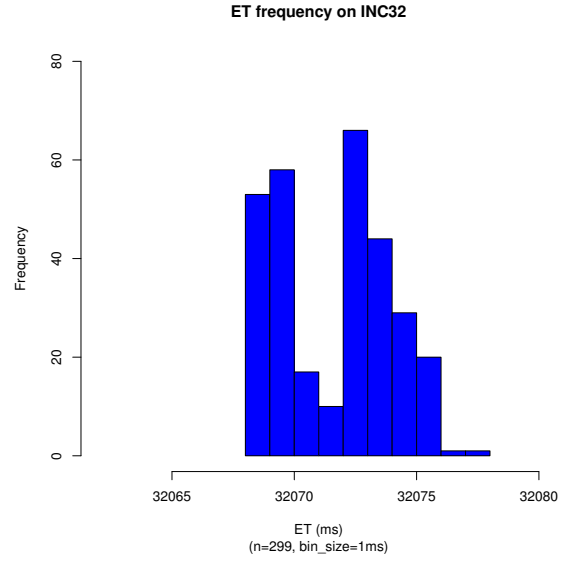


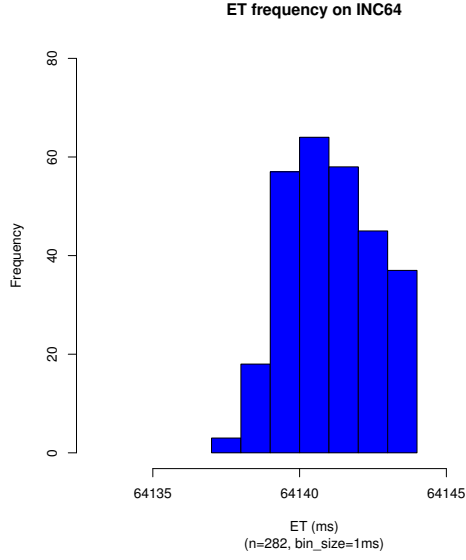
Figure 10: ET Histograms of INC1 ... INC8



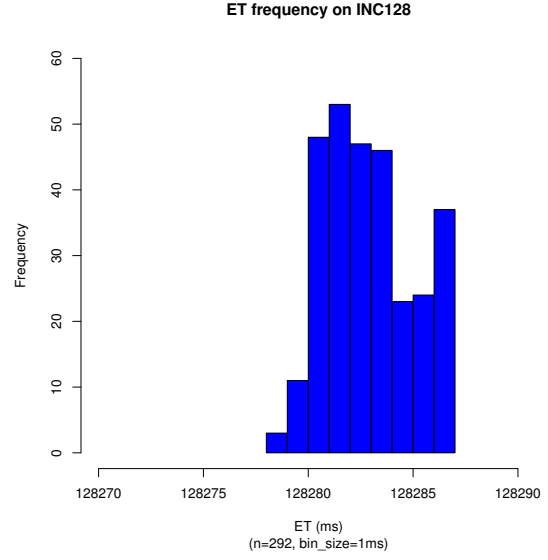
(a) ET frequency on INC16



(b) ET frequency on INC32



(c) ET frequency on INC64



(d) ET frequency on INC128

Figure 11: ET Histograms of INC16 ... INC128

5.2 PT

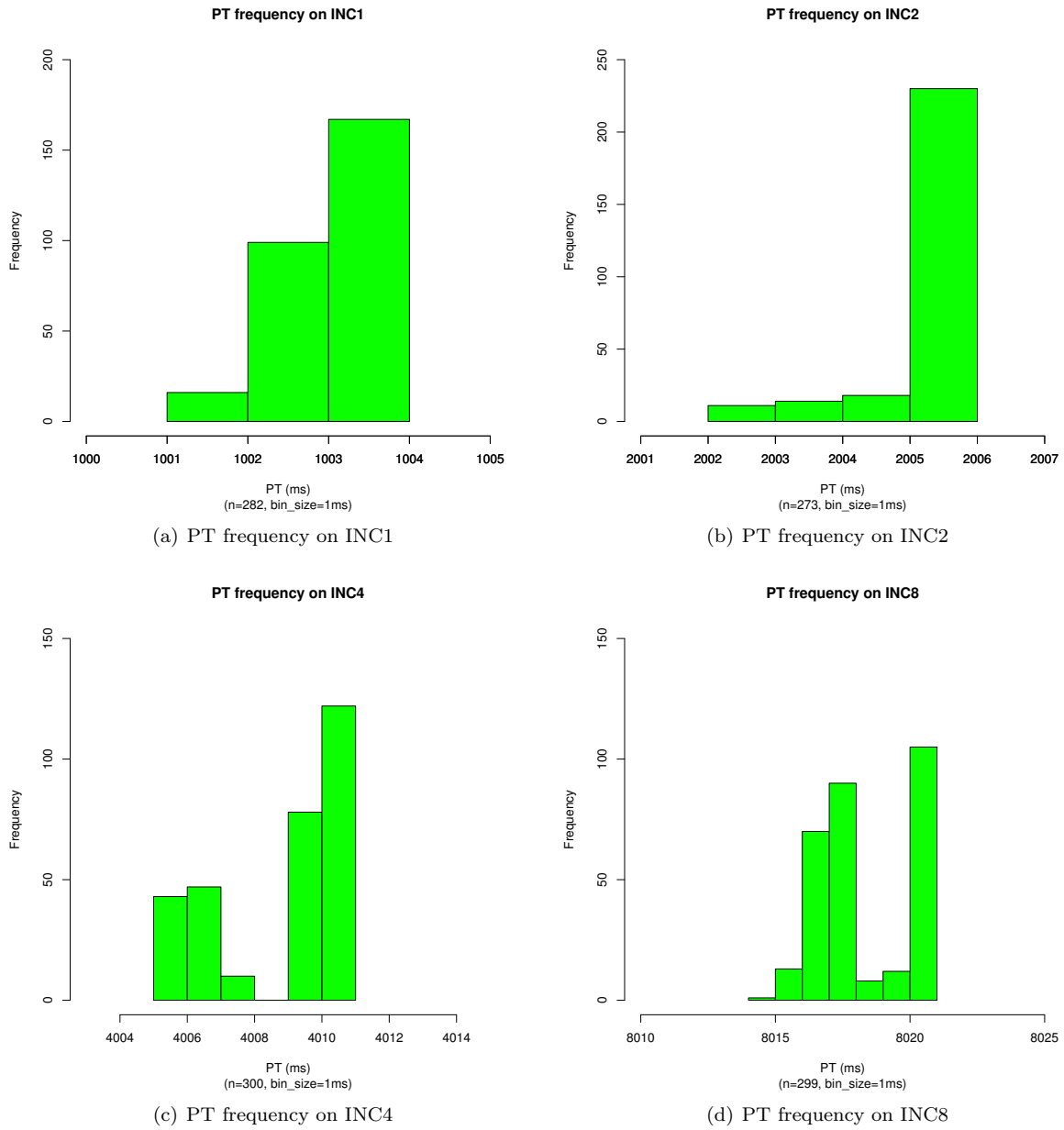
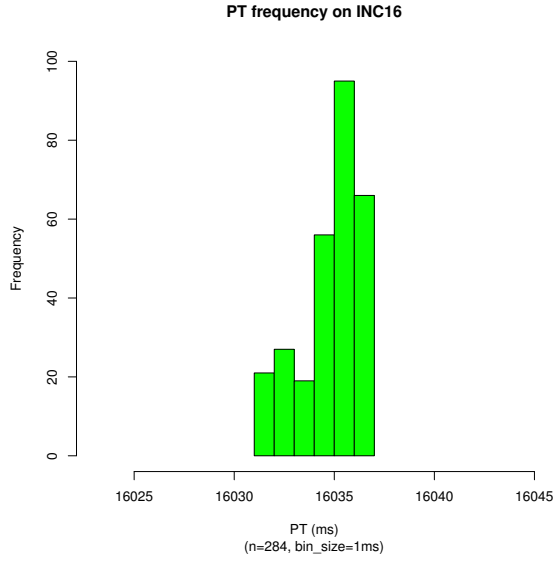
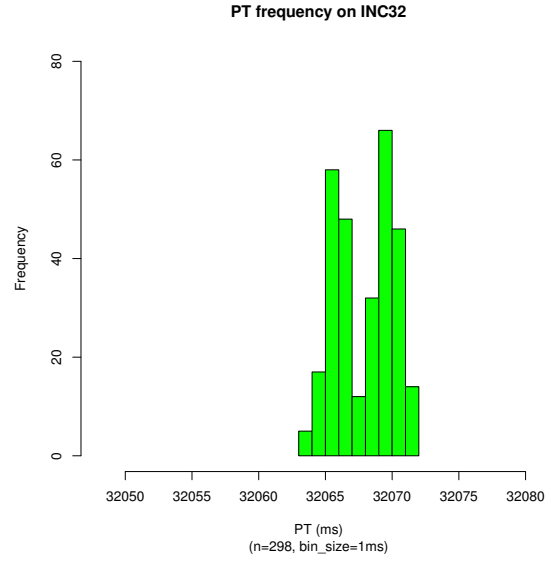


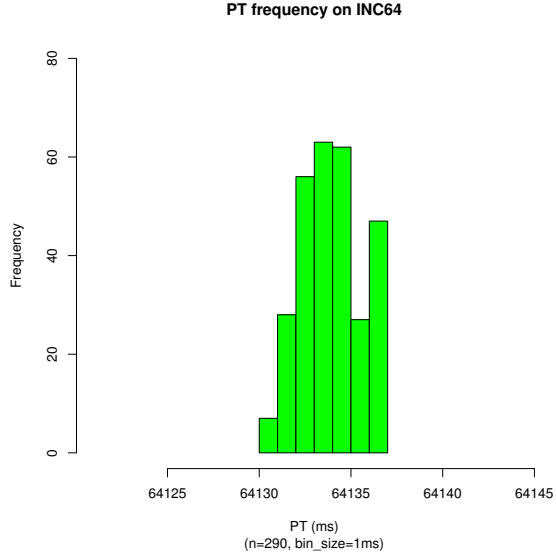
Figure 12: PT Histograms of INC1 ... INC8



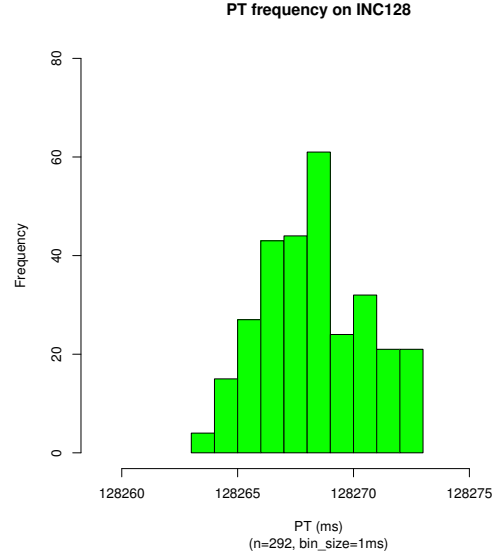
(a) PT frequency on INC16



(b) PT frequency on INC32



(c) PT frequency on INC64



(d) PT frequency on INC128

Figure 13: PT Histograms of INC16 ... INC64

6 sodb12

This section exhibits histograms on the EMPv5 data obtained on `sodb12`. The detailed description of the base data are from Table 1.

6.1 ET

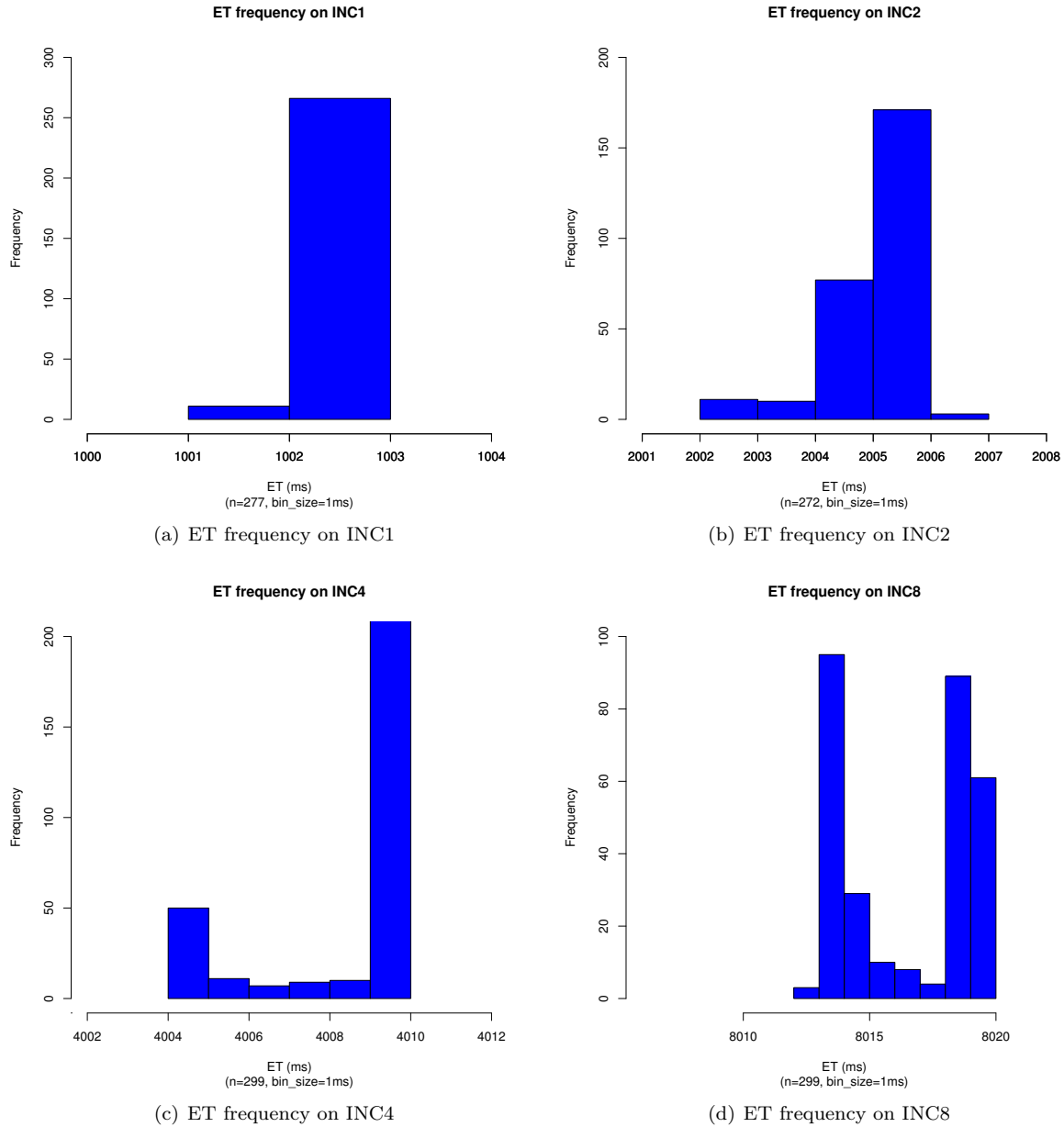
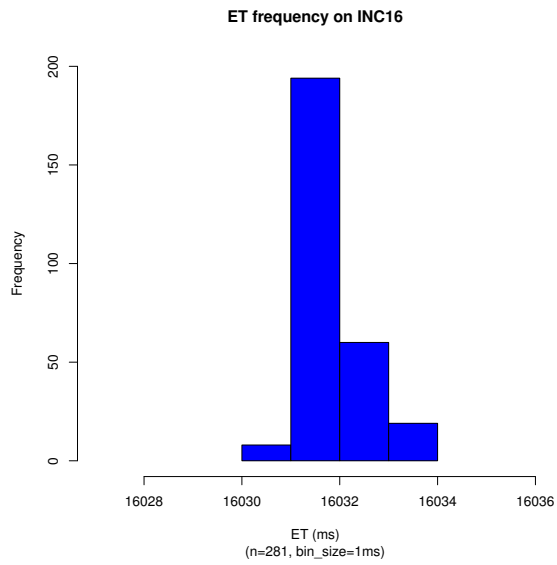
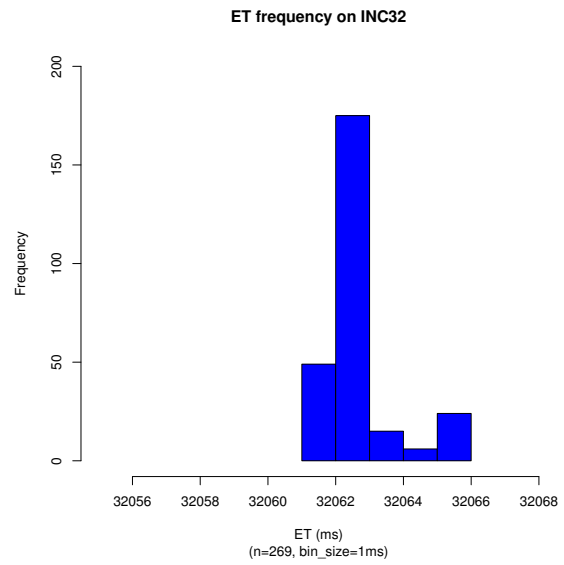


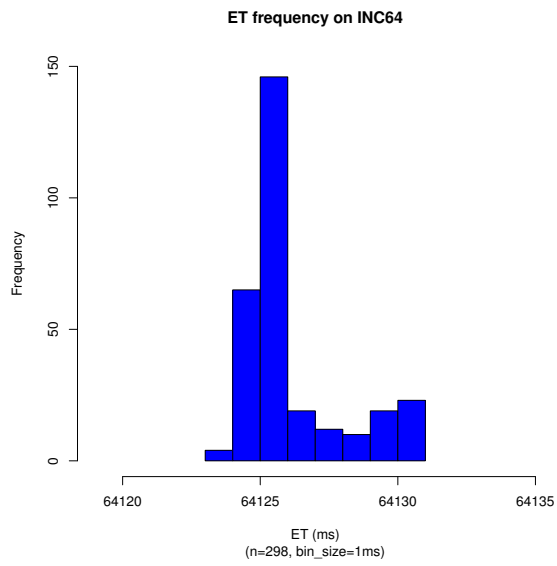
Figure 14: ET Histograms of INC1 ... INC8



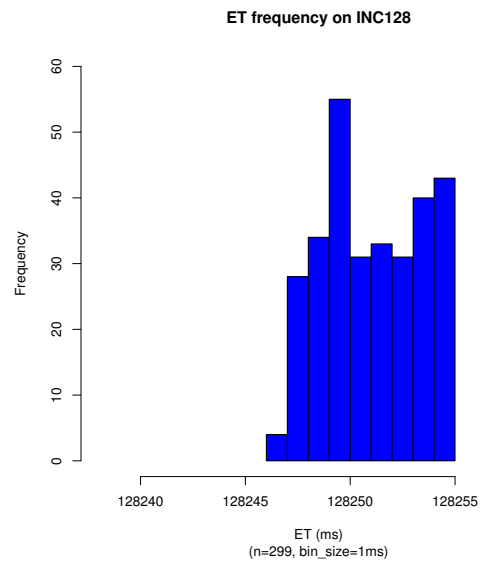
(a) ET frequency on INC16



(b) ET frequency on INC32



(c) ET frequency on INC64



(d) ET frequency on INC128

Figure 15: ET Histograms of INC16 ... INC128

6.2 PT

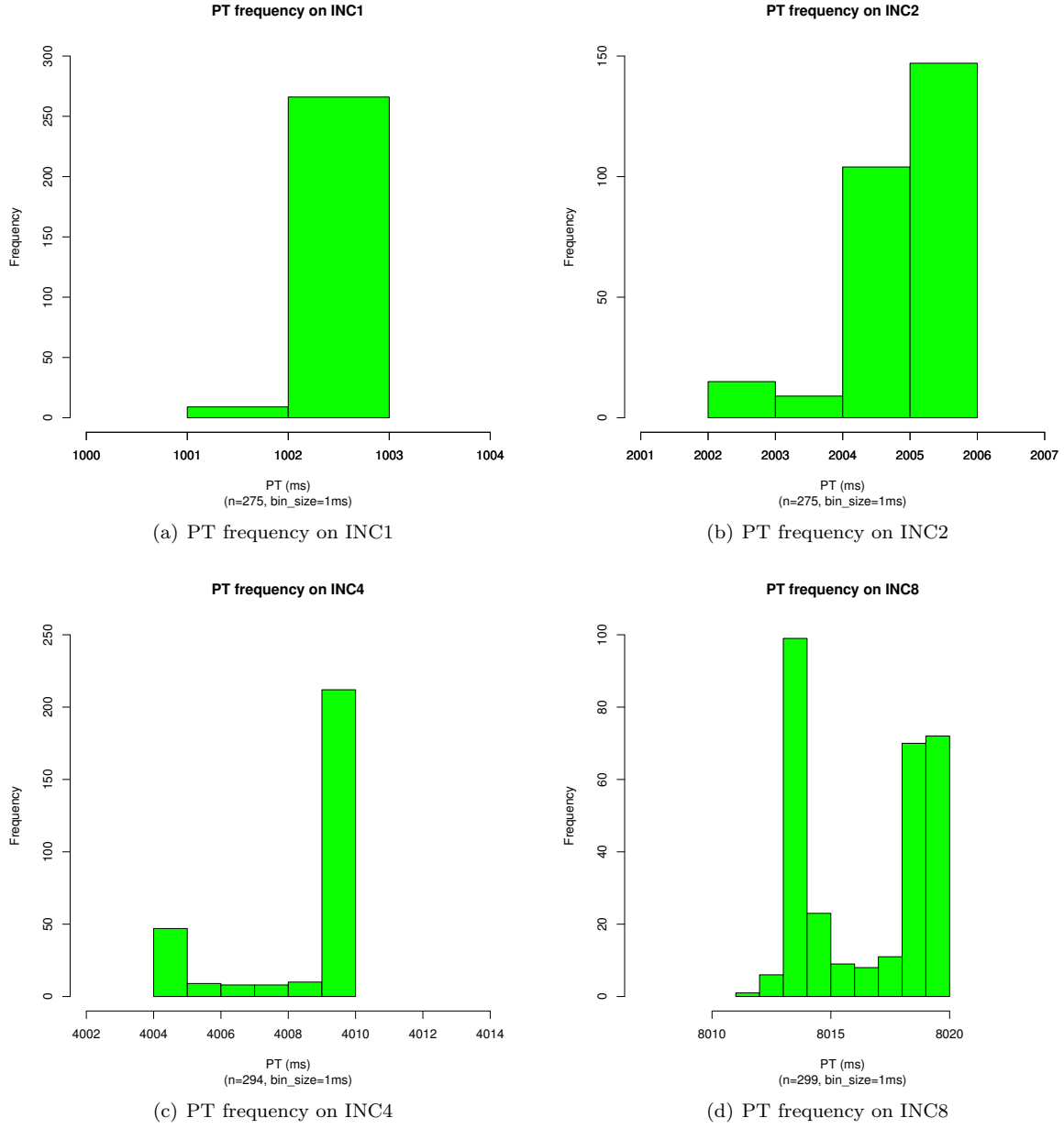
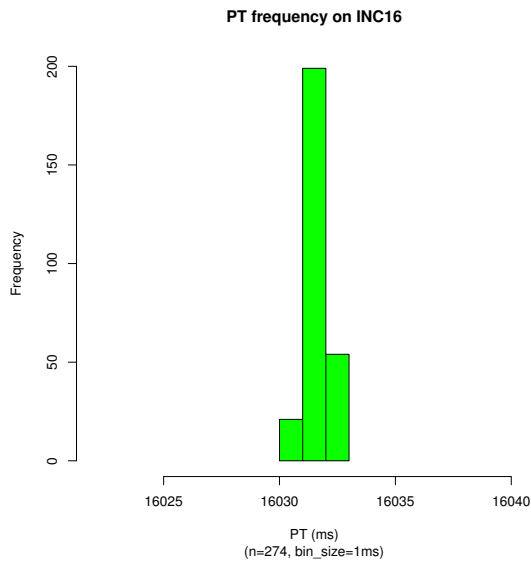
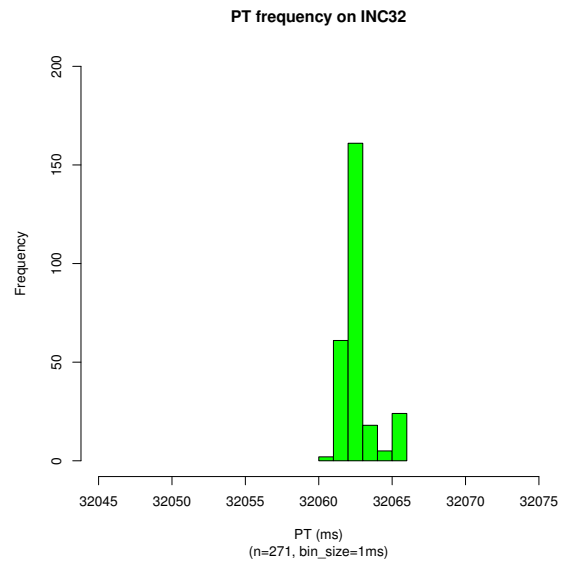


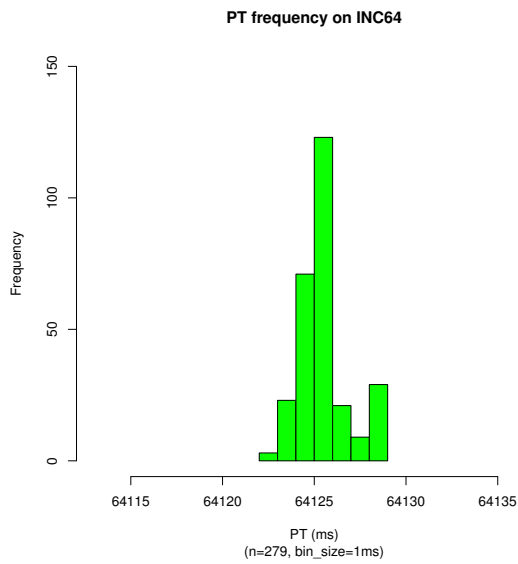
Figure 16: PT Histograms of INC1 ... INC8



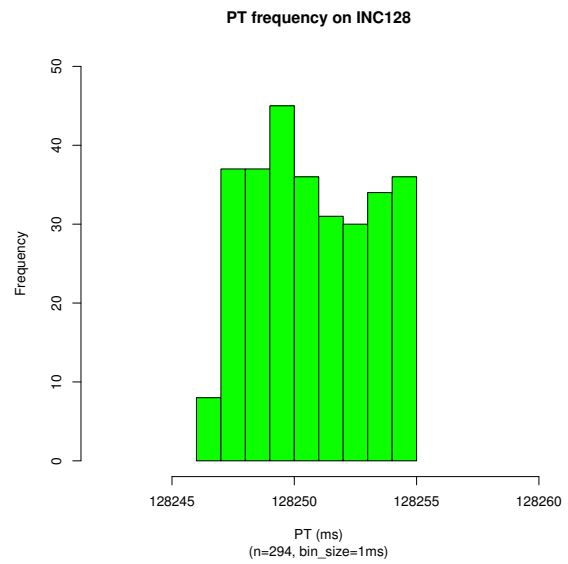
(a) PT frequency on INC16



(b) PT frequency on INC32



(c) PT frequency on INC64



(d) PT frequency on INC128

Figure 17: PT Histograms of INC16 ... INC64

7 Conclusion

My recommendation is to avoid `sodb8` and to use the rest of the SoDB nodes for the rest of our experiments. Further investigation is needed to examine why the experiment results on `sodb8` are different than those of the other nodes.