

Topaz: Problem Description/Overview

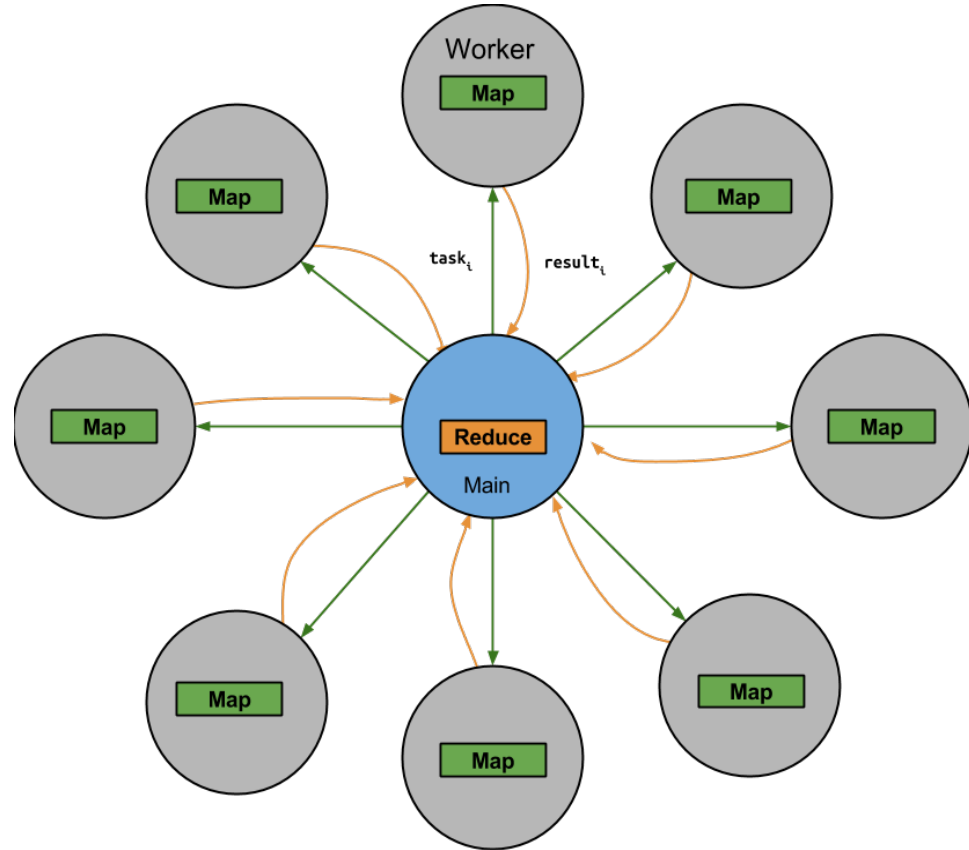
Unreliable/Inaccurate Machines:

- Potentially Cheaper, Faster, More Energy Efficient.

Question: ‘good’ result with little a-priori machine information?

Topaz

- **Computational Model**
 - 1 reliable ‘main’ machine
 - N unreliable/inaccurate ‘worker’ machines
- **Programming Model**
 - Map-Reduce Programming Model

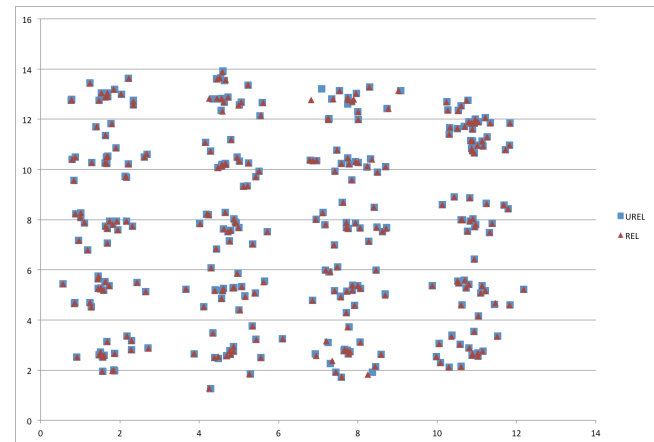
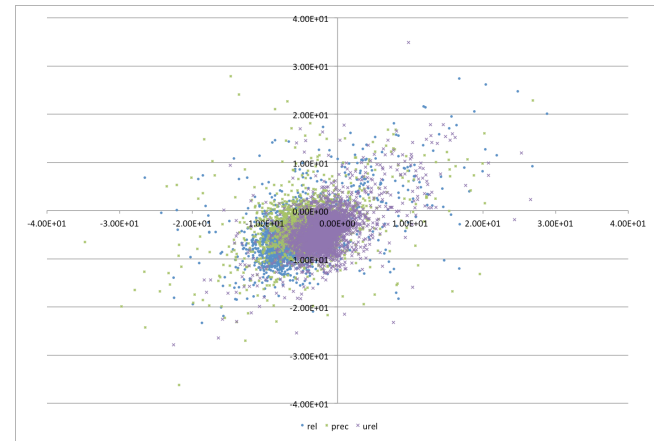


Topaz: Challenges/Solutions

January-March, May

Challenges

- **Problem:** Faults in critical sections of program cause crash.
- **Solution:** Map-Reduce Computational Model.
 - **Critical/Reduce:** Main Reliable Machine
 - **Map:** Unreliable Worker Machines
- **Problem:** Result pollution from soft errors during task execution (**Map**)
- **Solution:** Outlier detector
- **Problem:** How to train Outlier Detector?
- **Solution:** Re-Execution on Reliable Machine on outlier detect.



(top) barnes-hut galaxy simulation (bottom) water simulation