Time Evaluation

Wiener Filter Reconstruction

Testing Machines

Provided by SCI Institute

Testing Machines – Kraken

- 8 Intel(R) Xeon(R) CPU E7-4850 v4 @ 2.10GHz (16 core)
- 1024 GB of RAM
- Redhat Enterprise 7.5
- gcc 4.8.5

Testing Machines – Lakota

- 80 Intel(R) Xeon(R) CPU E-7-4870 2.40GHz(160 with HT)
- 750 GB of RAM
- OpenSUSE 42.3 (x86_64)
- gcc (SUSE Linux) 4.8.5

Testing Machines – Chiron

- 64 Intel Xeon x7560 2.27GHz cores (128 with HT)
- 504GB of RAM
- openSUSE 42.1 (x86_64)
- gcc (SUSE Linux) 4.8.5

Testing Machines – High Performance Cluster

- **64 HP DL160 G6 computation nodes**
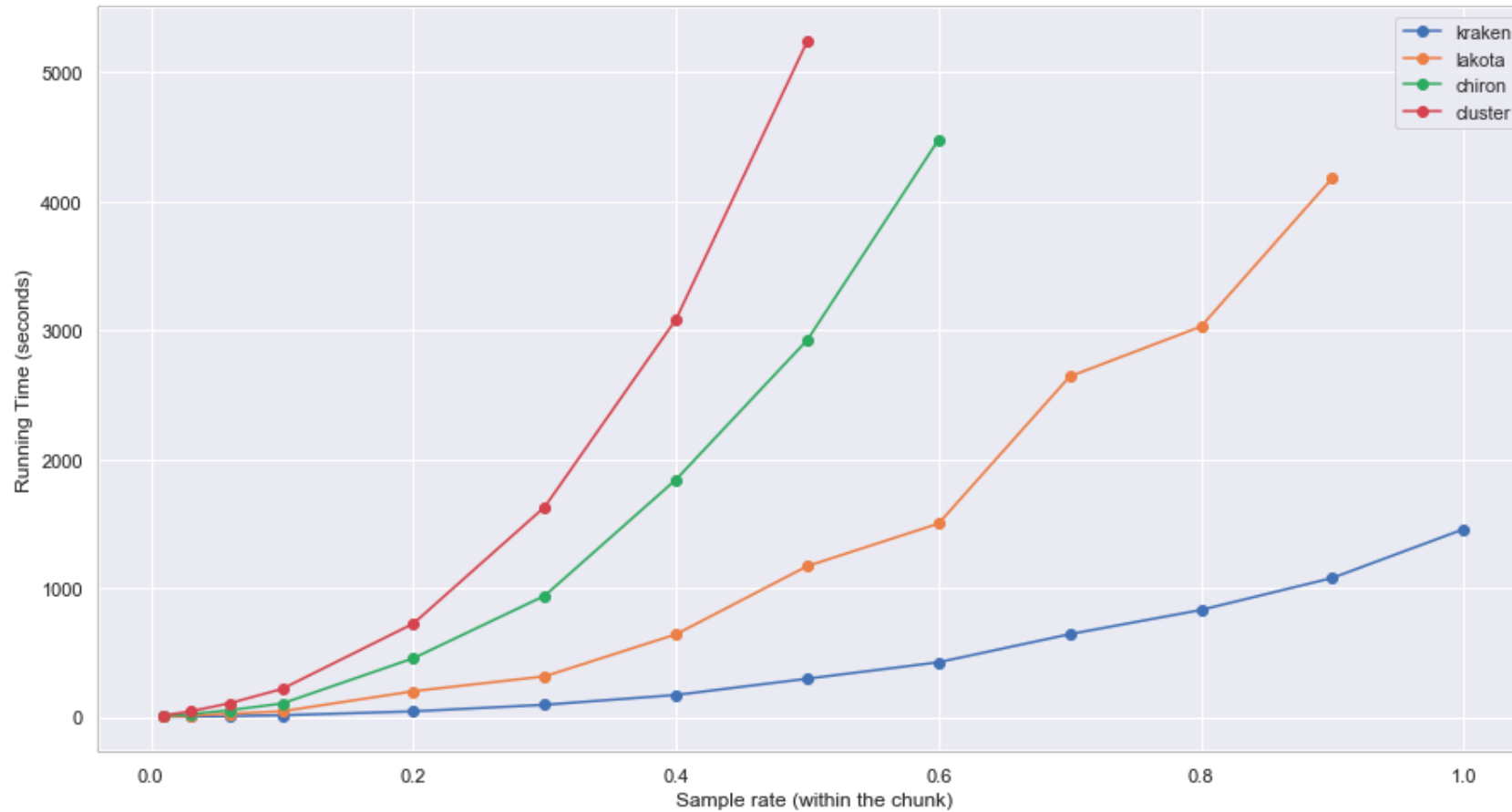 2x Xeon X5550 2.67GHz 4 core processors with Hyperthreading (16 threads per node)
  24GB of RAM
  HP InfiniBand 4X DDR Conn-X PCI-E G2 Dual Port HCA
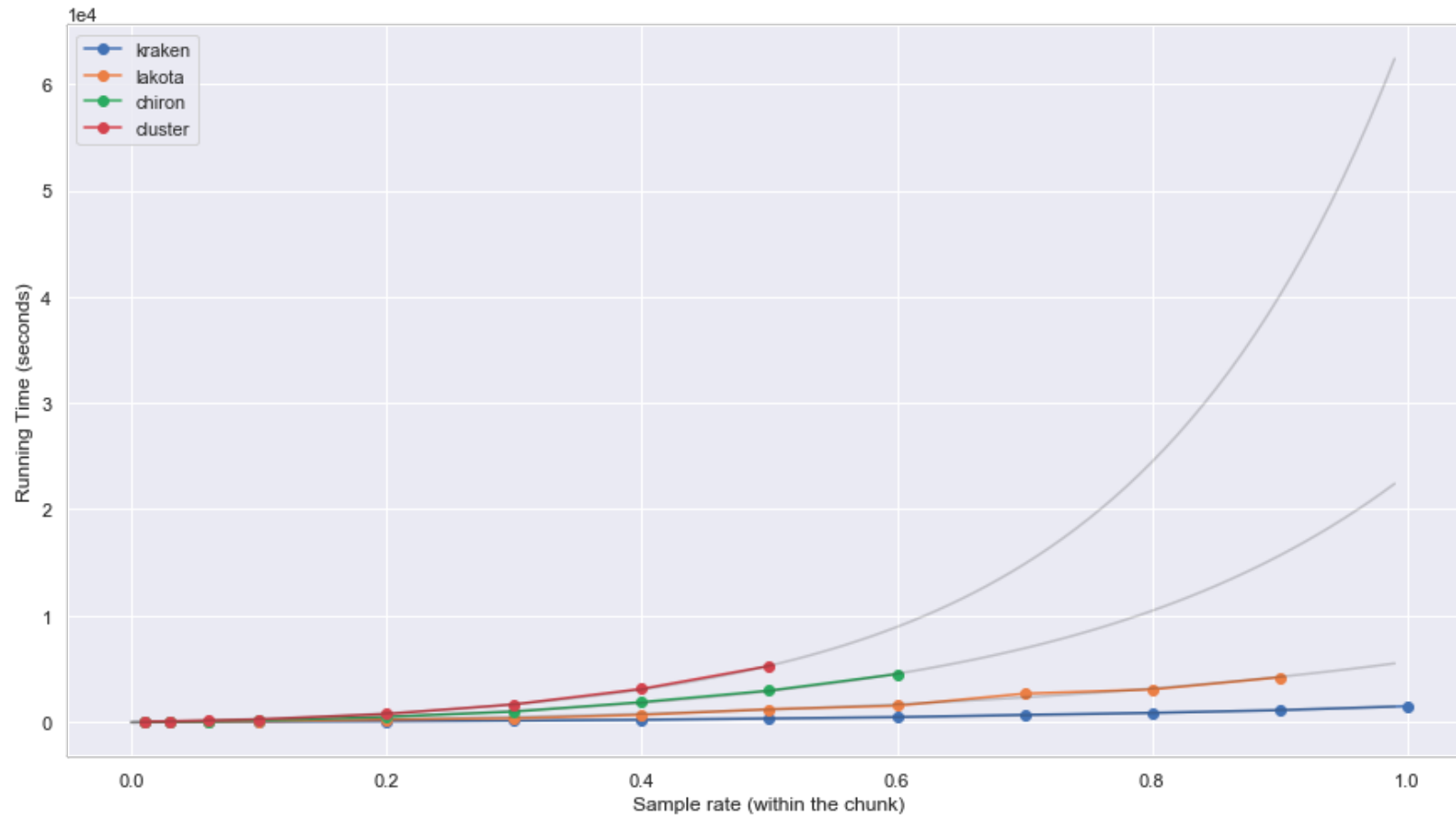 CentOS release 7.3

- Used only one node!

Time by Rate (fixed z range)

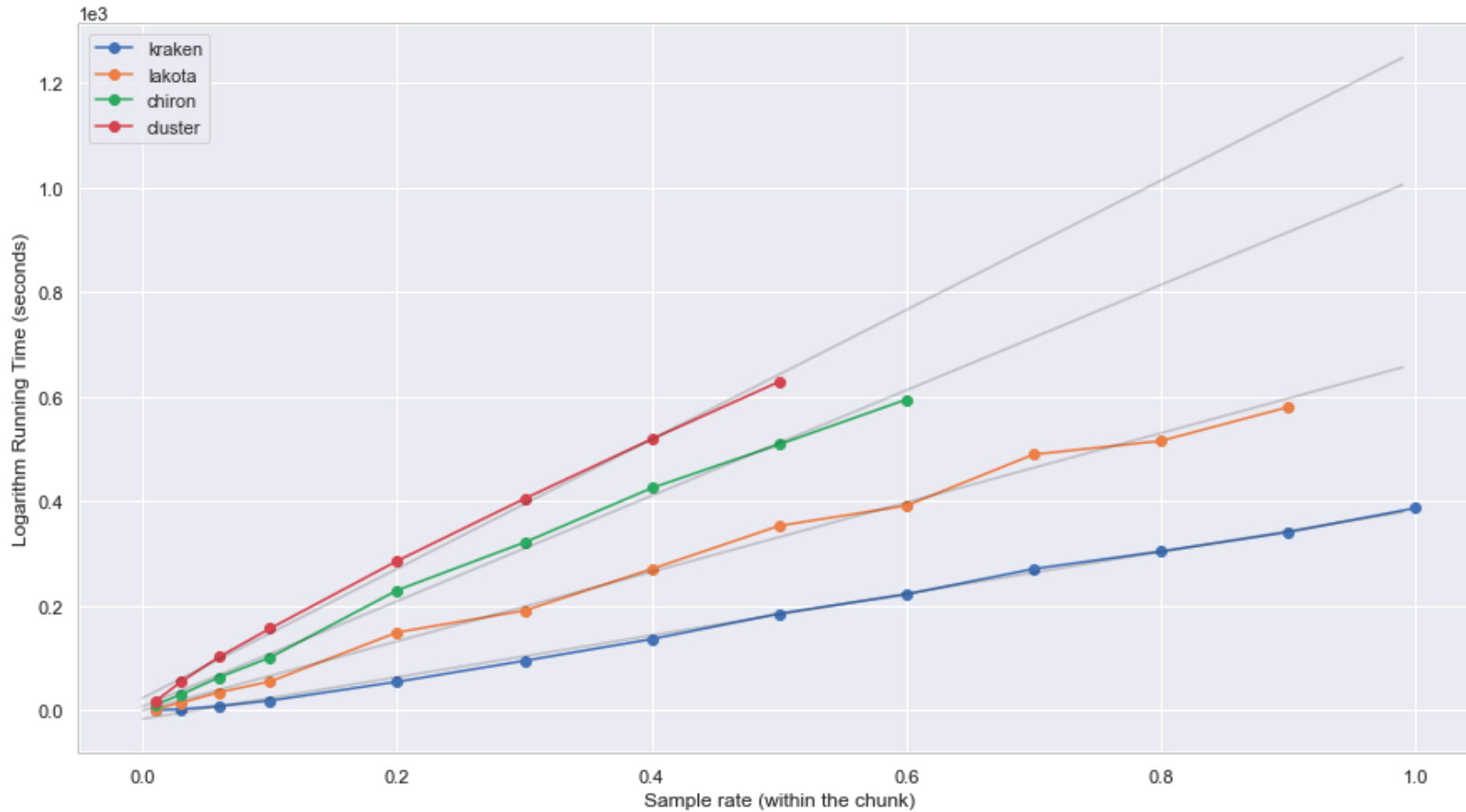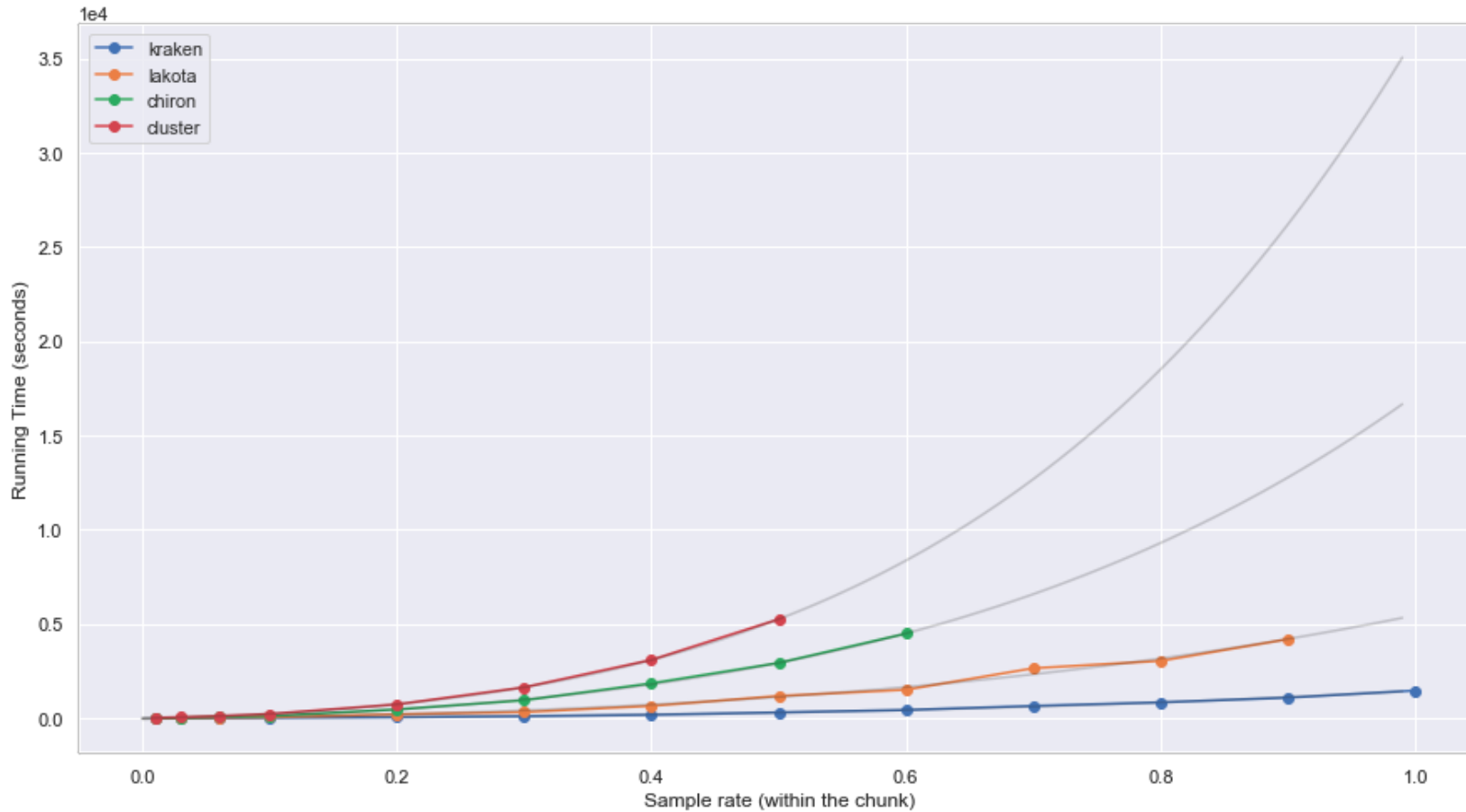# Time by Rate (200<z<300) – Plotting

Time by Rate (200<z<300) – Fitting (exp)

Time by Rate (200<z<300) – Log-fitting (linear)

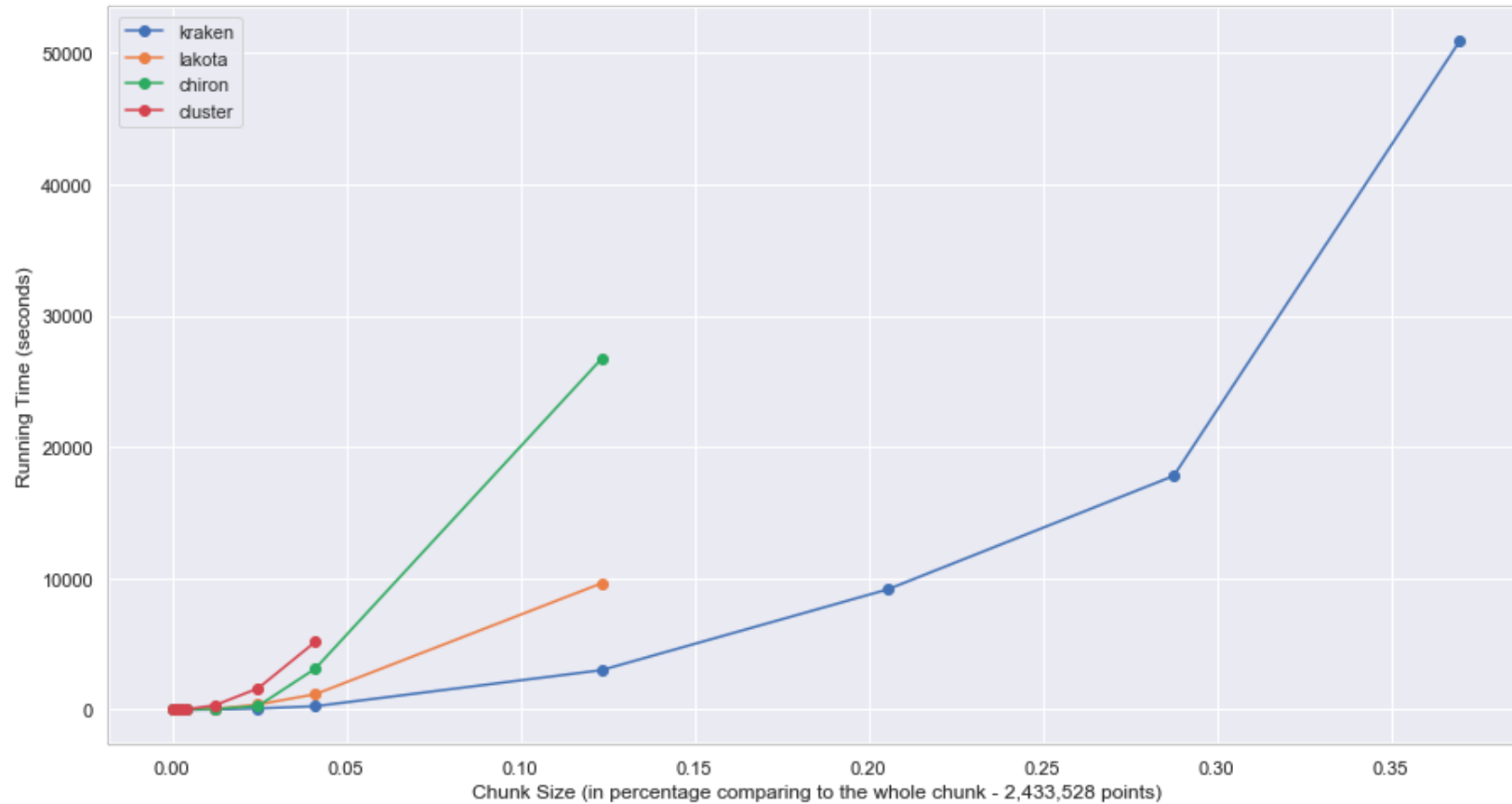$$y = (\log_e x)^3$$

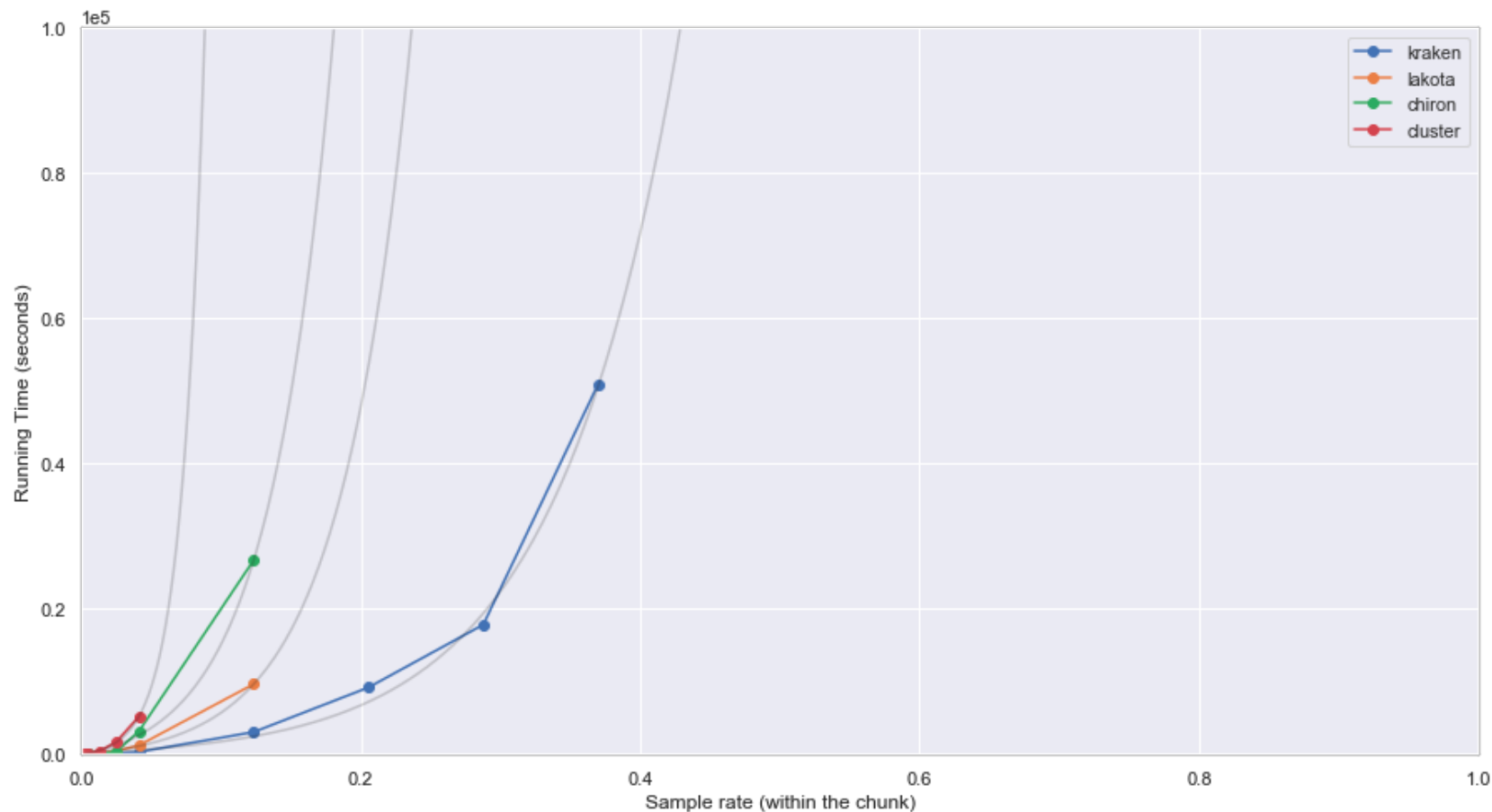# Time by Rate (200<z<300) –Fitting(cube root exp)

$$y = e^{\sqrt[3]{x}}$$
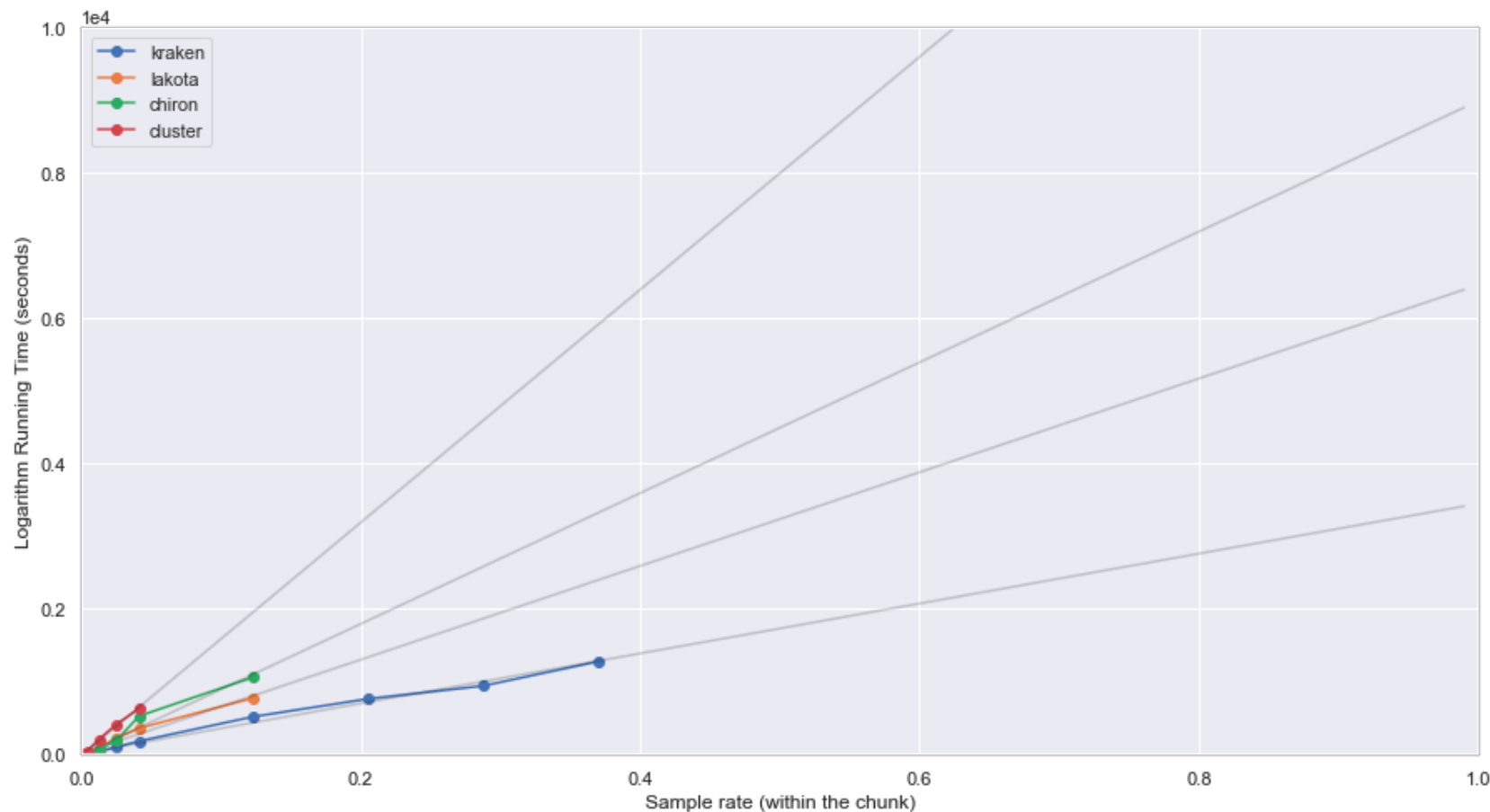
Time by Rate (fixed sampling rate)

Time by Chunk (rate=1) – Plotting

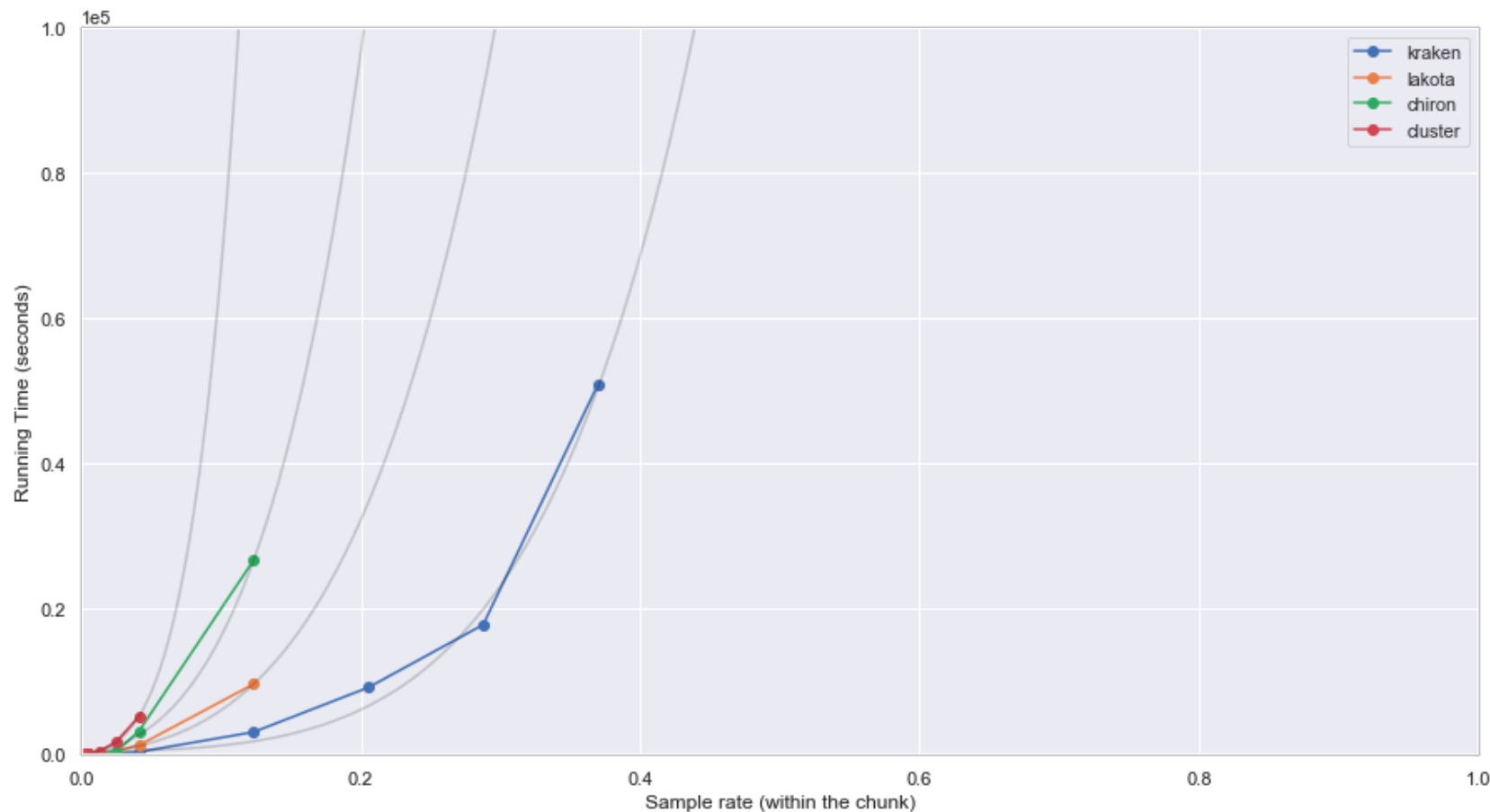# Time by Chunk (rate=1) – Fitting (exp)

Time by Chunk (rate=1) – Log-fitting (linear)

$$y = (\log_e x)^3$$

Time by Chunk (rate=1) – Fitting (cube root exp)

$$y = e^{\sqrt[3]{x}}$$

Prediction1 for Kraken

- With 1% (24,335) points, the interpolation will take 208 seconds.

- With 10% (243,353) points, the interpolation will take 0.47 hours.

- With 20% (486,706) points, the interpolation will take 1.86 hours.

- With 50% (1,216,764) points, the interpolation will take 2.63 days.

- For the whole data cube (2,433,528) points, the interpolation will take 2.22 years.

Prediction2 for Kraken

- With 1% (24,335) points, the interpolation will take 352 seconds.

- With 10% (243,353) points, the interpolation will take 0.32 hours.

- With 20% (486,706) points, the interpolation will take 1.69 hours.

- With 50% (1,216,764) points, the interpolation will take 2 days.

- For the whole data cube (2,433,528) points, the interpolation will take 57.21 days.

Suggestion

- Wiener Filter Reconstruction on the whole data cube might be doable. But the process should take several months to years. Will run the program for larger chunks to further evaluate the time consumption.

- Running Wiener Filter Reconstruction on small chunks and concatenate them back together is a compromise. (less than 10 hours for 5 * 20% chunks)

- Linear Interpolation is also another alternate. (scipy.interpolate.RegularGridInterpolator)