Speedup

The best way to express a performance improvement is a ratio called speedup.

For performance measured with time-based units (e.g., elapsed time in milliseconds or hours), this ratio is T_{old}/T_{new} where T_{old} is the time measured for the original version and T_{new} is the time measured for the modified (hopefully better) version. Speedup is unitless. Make sure both T_{old} and T_{new} are expressed with the same units.

For performance measured with rate-based units (e.g., frame per seconds), this ratio is R_{new}/R_{old} where R_{old} is the rate measured for the original version and R_{new} is the rate measured for the modified version.

Speedups greater than 1.0, means "new" is an improvement over "old". If the speedup is 1.2, we say "new" is 1.2 times better than "old". If the speedup is 2.0, we say "new" is 2 times better than "old".

Sometimes we report the improvement as a percentage. To do so, we must first remove 1.0 from the speedup. The result of this expression is the percentage improvement. For the two examples in the previous paragraph, the first "new" system is 20% faster the first "old" system and the second "new" system is 100% faster than the second "old" system.