Comparison and analysis for array, ArrayList and Vector

By constructing large collections and iterating them to sum the elements, a conclusion has been drawn on the performance of array, ArrayList and Vector. The table below shows the time it takes for these three data structures to construct and iterate a large collection that contains 150,000,000 elements.

Data Structure	Construction Time (ms)			Iteration Time (ms)		
	min	median	max	min	median	max
array	1282	1307	1467	47	53	65
ArrayList	2773	2848	4033	144	188	203
Vector	2784	2853	3185	617	794	884

As can be seen from the table, construction time and iteration time for arrays are much less than the other two data structures. Thus array can be the first choice if the size of a collection is already known for time-saving reasons. In addition, ArrayList and vector share similar construction time but the iteration time of ArrayList is shorter, so in general ArrayList enjoys higher performance than vector. Considering that a main difference between ArrayList and vector is that vector is thread-synchronous which means that it is thread-safe, while ArrayList is thread-asynchronous and unsafe, if thread safety is necessary for a task, vector is the one that should be chosen. Otherwise, ArrayList should be considered first for better performance.