Step 1
Alternative Tools Research

Contiguous Integration Tool
- **Bamboo**

Bamboo is highly rated in the devops world. One of the things users seem to like the most about bamboo is its intuitive user interface which features drag and drop operations for convenience. Users also love the notification settings. It can be easily integrated with Atlassian tools and can handle scaling and deploying projects of any size.

Getting Started:
Download here: https://www.atlassian.com/software/bamboo/download
Getting started guide: https://confluence.atlassian.com/bamboo/getting-started-with-bamboo-289277283.html

The getting started guide has 3 main steps, each with two sub-steps. Each of the sub-step link to new pages with detailed instructions. I estimate setup would take about 20-40 minutes depending on how experience you are with navigating new software. My initial impression is that you can get up and running with this program fairly quickly.

There is more extensive documentation for using bamboo here: https://confluence.atlassian.com/bamboo/bamboo-documentation-289276551.html

Bamboo seems to be quite popular among continuous integration tools. Bamboo is currently used by at least 108 companies according to stackshare. On GitHub I found some repos that had been updated within the last week as well as up to 7 years ago so it seems like bamboo is still in use and has a good track record of use.

Real Time Error Monitoring
- **Raygun**

Raygun is renowned for its precision in identifying the exact line(s) of code that cause an error. It come with advanced tracking features so you can see how your users are reacting to each deployment. Another key feature is its support for nearly any programming language or framework.

Raygun's getting started info is behind an account creation form: https://app.raygun.com/signup

They claim a quick, seamless, and easy setup using SDK's.
Complete documentation and user guides can be found at https://raygun.com/documentation/

Raygun seems to be a pretty prominent tool in the field. I found it ranked as the number one recommended error monitoring tool on a top 10 article form google. Raygun is used by at least 58 companies according to stackshare. On gitgub it looks like rayon is still used frequently. It doesn't seem to have the history of use that bamboo has but is still a growing product.

Step 2

Results for the largeArray	**Results for the mediumArray**	**Results for the smallArray**
insert 8.418292 ms append 515.417 µs	insert 159.75 µs append 53.875 µs	insert 11.458 µs append 11.583 µs
Results for the tinyArray	**Results for the extraLargeArray**	
insert 3.084 µs append 5.042 µs	insert 1.067072 s append 8.239375 ms	

Of the two functions the append function seems to be much faster in almost every case. This is likely because the insert method requires the shifting of all individual elements within the array while the append function is able to by pass all of that extra work and add a single element to the end of an array regardless of how many elements are already in the array.