

New Crustaceans of MarFS

Developing new MarFS tools in Rust



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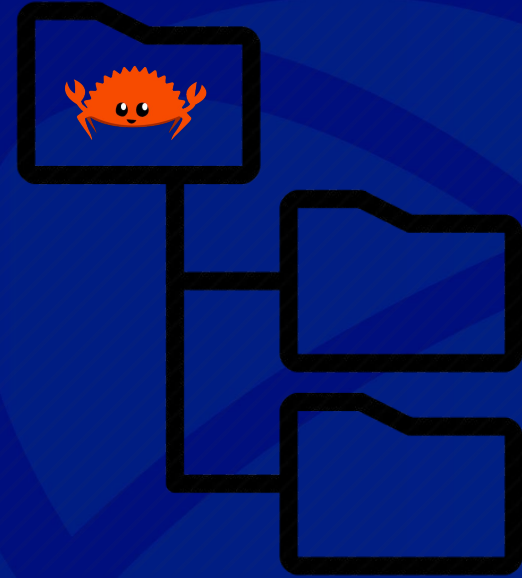
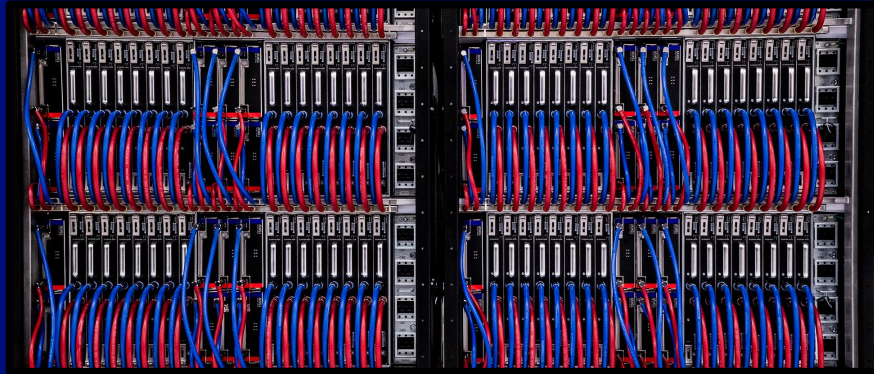
Mentors: Dave Bonnie and Garrett Ransom | HPC-INF

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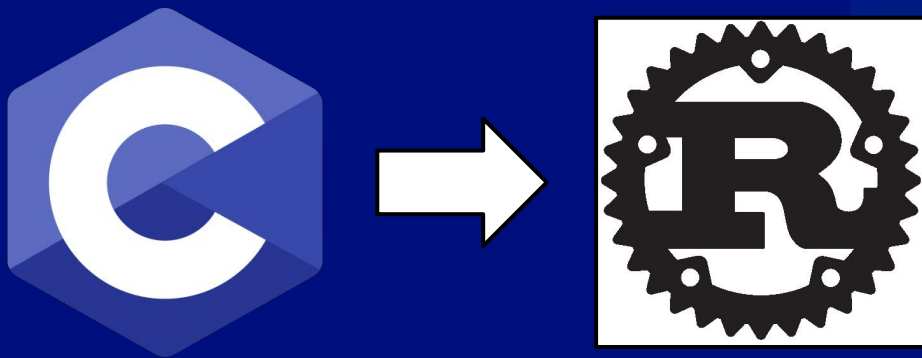
This Summer's Work

- Supercomputer Institute Boot Camp
- Coding a tool for MarFS config file namespace creation
- Coding a tool for parallel deletion of a trash directory



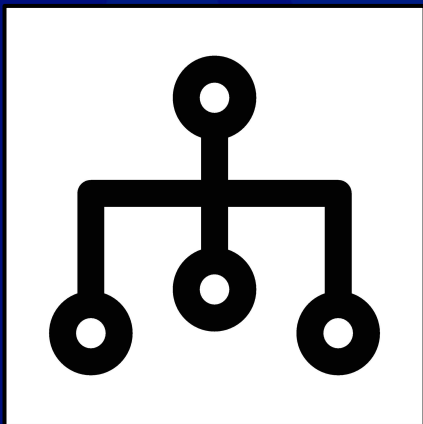
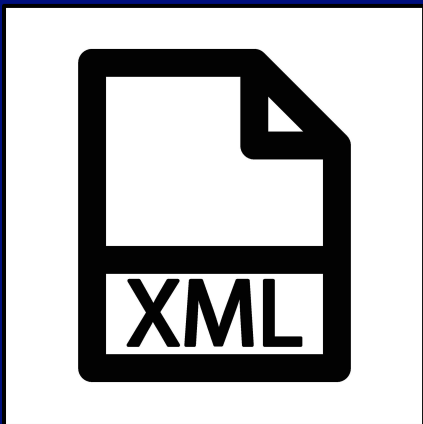
Shifting the MarFS codebase

- Resiliency is paramount in Campaign Storage
- The risk of using C outweighs its advantages
- Transitioning to Rust is the way forward
- So, new tools should also be developed in Rust



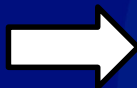
MarFS Config Namespace Tool

- Designed to automate the process of adding new namespaces to MarFS XML configuration files
- ~500 lines of Rust code
- Involved reading in the XML config file as a tree object and adding new namespaces according to MarFS logic



```
createNS -- --repo repo2 --path repo2/namespaces/subspace2/newNS -c MarFS_config.xml -f 10K
```

```
<ns name="subspace2">
  <perms>
    <interactive>SUBSPACE2-PERMS</interactive>
    <batch>SUBSPACE2-BATCH-PERMS</batch>
  </perms>
  <quotas>
    <files>300K</files>
    <data>SUBSPACE2-QUOTAS</data>
  </quotas>
  <ns name="target"/>
</ns>
```



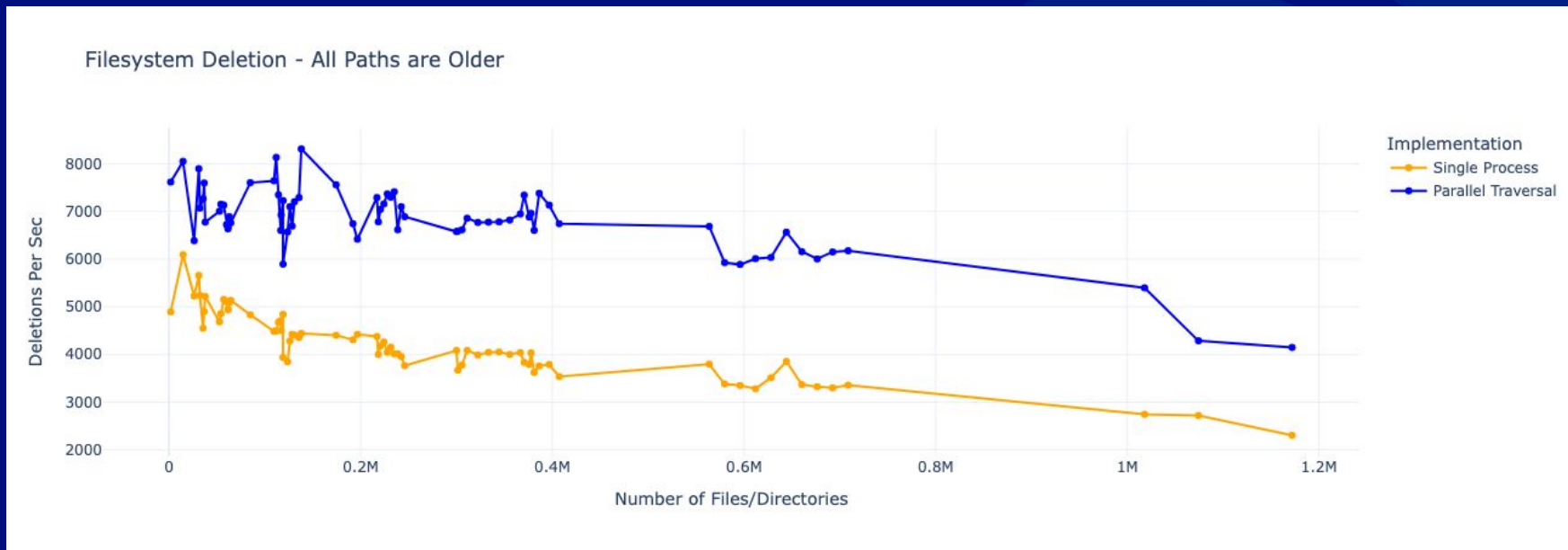
```
<ns name="subspace2">
  <perms>
    <interactive>SUBSPACE2-PERMS</interactive>
    <batch>SUBSPACE2-BATCH-PERMS</batch>
  </perms>
  <quotas>
    <files>300K</files>
    <data>SUBSPACE2-QUOTAS</data>
  </quotas>
  <ns name="target"/>
  <ns name="newNS"> <!-- Addition Here -->
    <quotas>
      <files>10K</files>
    </quotas>
  </ns>
</ns>
```

Filesystem Parallel Deletion Tool

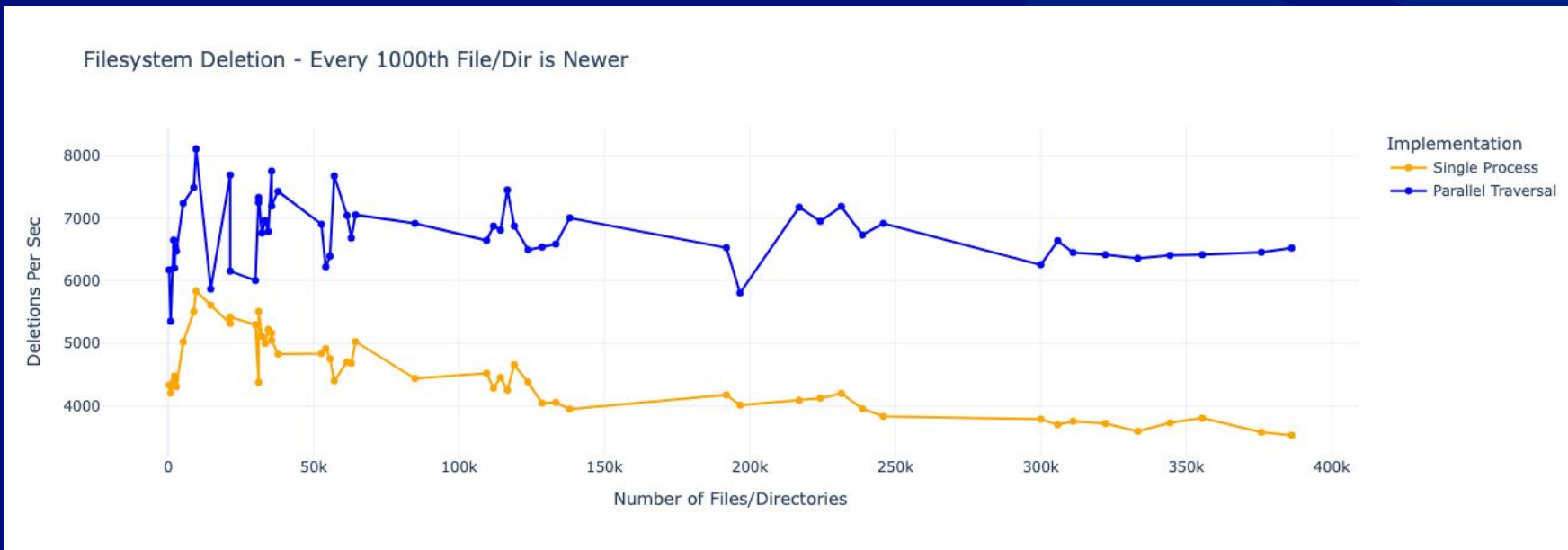
- Will be used to clear trash bins in MarFS and Lustre
- Initially implemented as a single process, but needed to be faster
- According to the ctime (change time) of the root directory, the transfer id, walks through a filesystem in parallel and deletes older paths sequentially
- Keeps newer paths and prints them out to the user so that only older data is deleted

```
NEWER path detected: trash2/transfer_id/folder364/folder365/folder446/folder473/folder482/file809.txt  
NEWER path detected: trash2/transfer_id/folder364/folder365/folder446/folder473/folder482/folder483  
NEWER path detected: trash2/transfer_id/folder364/folder365/folder406/folder407/folder416/file703.txt  
NEWER path detected: trash2/transfer_id/folder364/folder365/folder406/folder407/folder408/file693.txt  
NEWER path detected: trash2/transfer_id/folder364/folder365/folder446/folder473/folder478/folder479  
NEWER path detected: trash2/transfer_id/folder364/folder365/folder446/file773.txt
```

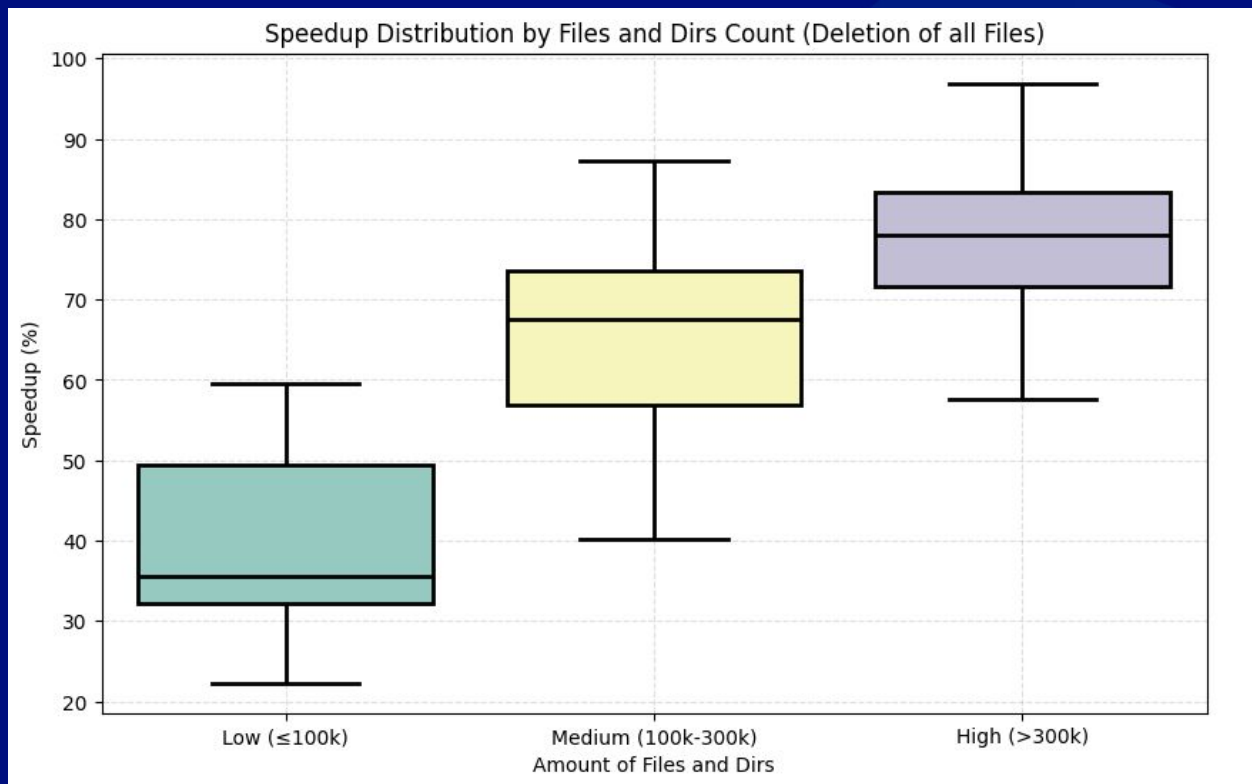
Filesystem Parallel Deletion Tool - Figure 1



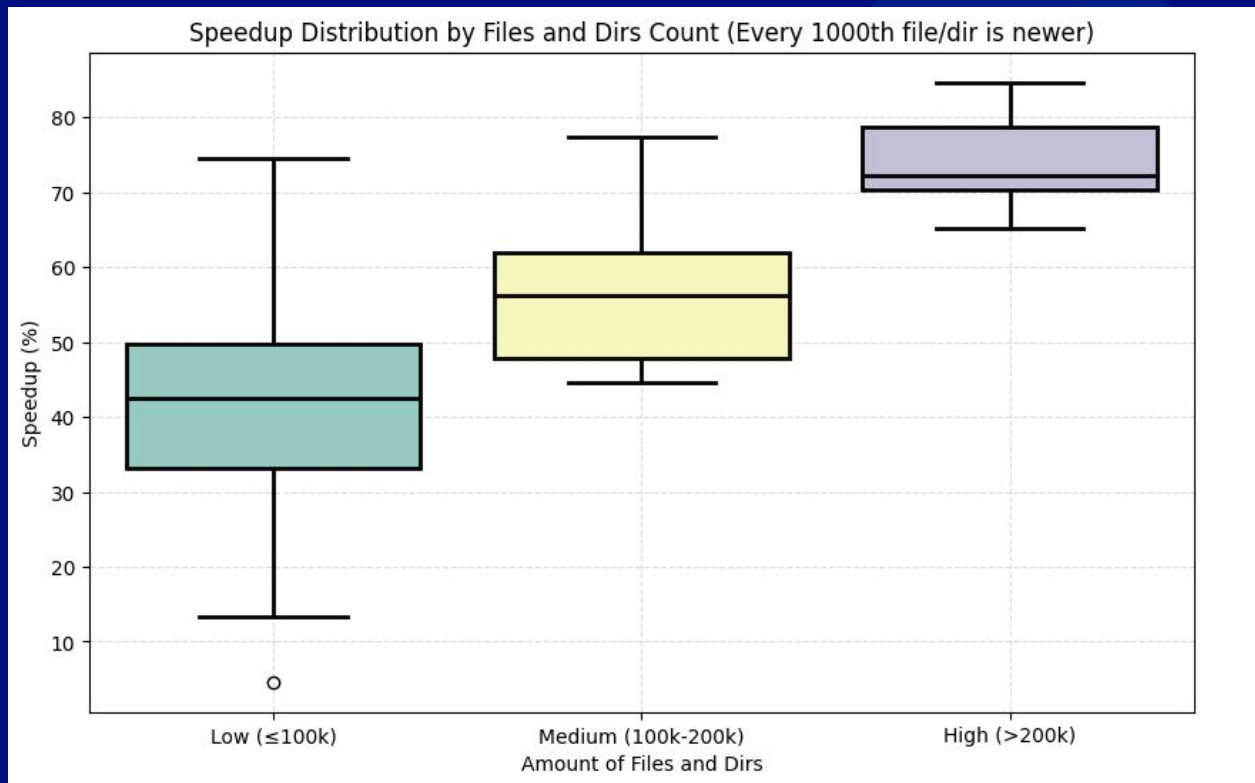
Filesystem Parallel Deletion Tool - Figure 2



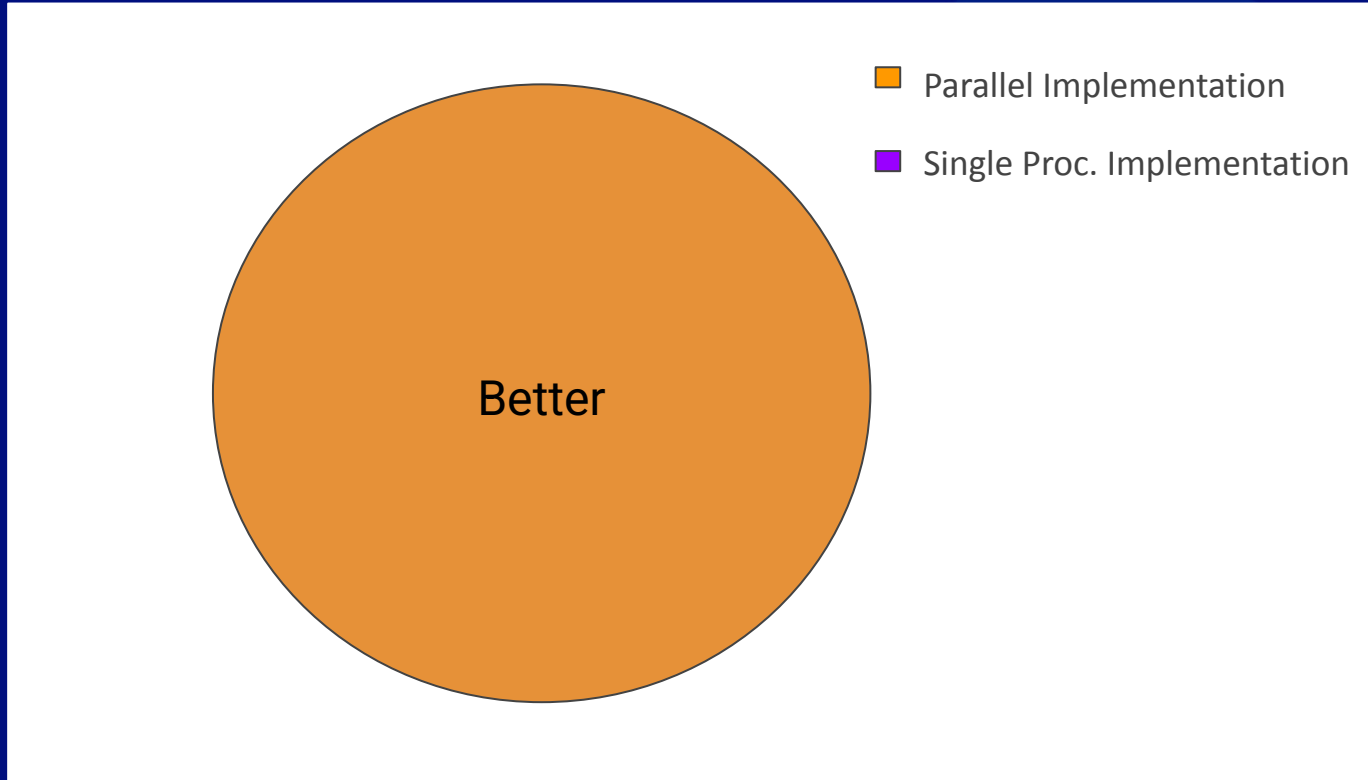
Filesystem Parallel Deletion Tool - Figure 3



Filesystem Parallel Deletion Tool - Figure 4



Filesystem Parallel Deletion Tool - Figure 5



Questions?

Thank you!

