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https://youtu.be/zNJs8g\_N53g

https://github.com/WilliamEskins/CSCWebComparison

**1.Detailed Description about project progress:**

Our group decided to tackle the performance evaluation part of the project. For the performance evaluation project, we had to select four benchmarks from *An Updated Performance Comparison of Virtual Machines and Linux Containers* that Dr. Ngo had linked us. We originally had selected CPU-PXZ, Memory Bandwidth—Stream, and HPC-Linpack. We found some of these to be much more difficult than the benchmarks we later picked which were Linpack, Netperf, Stream, and Redis.

The subtasks of this project originally was to automatically install KVM, Docker, or Singularity on a single CloudLab profile, to automate the install and configure of the selected benchmarks and run the benchmarks, and to automate the entire process within a single CloudLab profile and instantiate/collect results of at least 20 runs. The automation processes were later removed by Dr. Ngo to make it a little more feasible.

We started off this project by creating a GitHub profile with all four of our names and the project description on a readme file. During the quarantine, we have met multiple times using zoom to discuss the next possible steps for our project. We found this method to be the best way to communicate precisely and effectively. At the beginning it felt like as a group we could tackle and run these benchmarks but as we drew closer we found that it was a much more difficult task than what we originally visioned.

During our process of getting four to five benchmarks running (using a fifth to make sure we did not pick four difficult benchmarks) we found that they were repeatedly failing. We weren’t sure if we were supposed to get the containers to use for our benchmarks or if we were just supposed to download them once on the server through commands. We were also having errors logging into docker. The solution came with one of our members asking for help from another team working on the performance evaluation and gathered very useful information from them.

We managed to get the main Ubuntu to run and we were also in the process of installing the docker files and running them.We were not exactly sure whether we were supposed to get run commands to get the docker to run, for example “apt get linpack”, or if we were supposed to have the docker section in github and just run the commands to run each of the tests we had. We found the info that we could use something similar to the repositories we used in class and got past that problem fairly quickly.

We have looked at all of the contributions and help and it had helped me understand that I could have made the process easier with a docker container management system rather than trying to instantiate and install them separately. I was not able to finalize the project but I learned a lot about the process of running cloud computing systems. There were many helpful classmates among us that could have expedited the process of development in class but were still helpful with some detailed information to point us in the right direction they were also headed.

(Deliverable 2) As for the final current state of our project, we have collected all the benchmarks and info we should need to get some of these to run using docker. Unfortunately, we are struggling to get a single one to do so. We plan to get all or at least most of them to run for our final deliverable. We believe that by continuing to use zoom and communicating online that this will be a very achievable goal. Collaboration among group members and other groups allowed for further understanding and provoked the most learning.

(Deliverable 3) For the Final state of our project for Deliverable 3, we have not been able to get any of our benchmarks to run. We have however recorded our video for deliverable 2 and put in a lot of work in other places. On Piazza we answered all the questions that were asked about our project and each of us also asked questions in other projects like we were told to do so. For deliverable 2 we worked exceptionally well as a group and coordinated very well on zoom and our video presentation. We were not able to fix our technical problems despite following the help of others during this last week sprint to finish the project.

**2. (Deliverable 2) Self-assessment about whether the project has met the second deliverable:**

Ian - As of right now our current project is almost finished completion of deliverable 2. We have this technical document, our 4 benchmarks that we have chosen, and we plan to do some sort of recording to post on Piazza by the deadline. We also are very much ready for the 24 hour Q and A that will be hosted on Piazza.

Rachel - Even though we have run into issues, we are working hard to solve them and getting feedback from our group and others running into similar issues coming into the final deliverable. However, we are in the process of the soon completion of deliverable 2 at the time of this recording.

William - There have been set backs and we are missing a few of the key points of Deliverable 2. We have come a far way from understanding almost nothing about networking before this class. The Docker server is up and I tried hard to get the test packages to install correctly. It will need more work within the next few days to catch up.

Louis - I believe that, as far as our talents and knowledge have enabled us, we reached our goal with regard to Deliverable 2. As stated by my peers above, we have finalized our four benchmarks and have started planning when and how we will be recording Deliverable 2. The question at hand is what sort of information will be contained within Deliverable 2. As of now, we have determined particular roles for each team member. In other words, each team member will go into detail about their designated section, i.e. Communication, Planning, Deployment, etc. I feel that if I, personally, had a deeper understanding about Cloud Computing in general, I could have contributed more to the group as opposed to merely following the agreed upon plan.

**3. (Deliverable 2) Self-assessment and projected milestone about whether the project can make the final deliverable:**

Ian - We believe at this very moment we can definitely finish the project for deliverable three and have it ready to be turned in. But this will of course require more zoom meetings and possibly some questions answered by Dr. Ngo or Other teams that are willing to give some tips. We obviously want to make this project our own though and not a byproduct of other people's work and information so we have spent a lot of time working within the group figuring out the development on our own. This has potentially affected our progress but I do believe it made the project more of our own.

Rachel - With continuous feedback and testing, we believe that we will make the final deliverable. Even though it was at first difficult to work effectively with each other over Zoom rather than in person, we have learned to better utilize our resources and are able to discuss with each other frequently by setting up more times for discussion, which is a crucial step for the success of our project. We have a solid foundation for this project and with a little more direction from questions and research, we believe this project will be successful.

William - Currently the project is behind our own expected progress but I believe this is mostly due to not being able to interact as well with others and each other except for these Zoom meetings. There was some guidance that helped us along the way greatly and if we continue to work together towards the technical parts of the server we can definitely figure out how to run the different tests by the deliverable date. We have learned a lot of the difficulties and different configurations to use in order to get Docker to run.

Louis - At the time of writing this, Deliverables 1 & 2 have been completed. If we continue at this trajectory, Deliverable 3 will be continued in a timely fashion. Our group has been diligent in adhering to deadlines thus far and I have no reason to believe this will change. Considering all of the information we have compiled and the experience we have gained, the production of Deliverable 3 will be straightforward. I think I can speak for the group when I say that our projected milestone, overall, is a complete and respectable project. Respectable in a sense that we put in the required effort and coordinated the necessary meetings in order to produce said project. Though I am proud of what my group has accomplished given our experience and knowledge of Cloud Computing, I couldn’t help but admire what Group 2 had accomplished with their Minecraft server.

**4. (Deliverable 3) Self-assessment about whether the project has met the final deliverable**

Ian - For the final deliverable I do believe that we have enough to turn in. We plan to update our GitHub with the new edited Detailed Rubric we have here. As for the benchmarks we did not get them to run. I believe this was because we struggled more with the online meetings and I believe we would have gotten it done if we had in person sessions and class time to discuss to our professor and each other about the next step. I am proud of the work my teammates and I put in despite the struggles with not seeing each other in person. I believe we got a lot more done that we had envisioned.

Louis - We are at the end now and I must say that it was quite the tumultuous journey. Firstly, I want to say that we HAVE met the final deliverable. To go into detail, I would say that although we met the final deliverable it wasn’t without difficulty. In the early parts of the journey, our group was a bit disordered in that we didn’t know in which direction we wanted to take our project. After finally agreeing on our deliverables, the real work began. I hope that my team members won’t be offended when I say that we were all a bit limited in our understanding of the intricacies involved in Cloud Computing. Will stood out in having a stronger understanding of how to navigate and deploy the deliverables than the rest of us and he took the lead with regard to the direction we were going to take our project. We followed his lead and helped him with whatever it was he needed. Overall, our group was very respectful of meeting times and deadlines and for that I am grateful. I could not have asked for a more cooperative and friendly group. There were no personality conflicts and I feel that we all had expressed a practical level of synergy.

Rachel - I personally believe that we have met the final deliverable. Even though we were not able to get benchmarks to run in the end, I feel like our team members worked well with what we had and tried our best to figure out how to solve issues that our project faced. If I were to change anything, it would be to collaborate in person because Zoom calls were more limited and proved to be more difficult to collaborate with members and the professor, especially working on different computers of our own. But despite the difficulties, our group was able to communicate frequently and work together with the best of our ability to finish this project.

William - This was a very arduous and long process to get here. There is still some configuration to do to get all the tasks to run correctly.. Personally I was able to learn an excessive amount of cloud computing on subjects similar to docker and put countless hours into trying to learn to run these tests on my own cloud lab profile. We learned to collaborate together in order to consistently progress forward. There were many setbacks with failed tests but we continued to meet and put thought into directing the project toward the solutions and pathway to running the tests. Overall we learned how to navigate, build, and about the technicalities of running cloud computing projects together even when we are not allowed to meet in person. We provided the best explained presentation to illustrate our progress, problems and solutions as well as how much we learned. We met the deliverable in every aspect besides the performance aspect due to lack of technical expertise on configuring and lack of time to bug fix after getting help. Not meeting in person affected the progress negatively. We were very limited on ability to move around and share many sources and screens in order to gather accurate and

working information but we did learn a lot of correct information into tests, benchmarks and docker configuration.