

Parallac: Using Chapel with ARM Clusters

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Parallac (parallac.org) is an experimental platform using ARM-based clusters I have built to take advantage of low-power systems with GPU acceleration (Nvidia Jetson TK1). Although Chapel does not yet support GPUs, it is ideal for exploring distributed IO intensive applications on these clusters and provides an interesting basis of comparison when used to build service-oriented architectures (SoA) that are more commonplace in Internet applications.

Since ARM clusters are relatively uncommon, this presentation will highlight deployment details, the advantages and challenges encountered when using Chapel on ARM. For this presentation examples were tailored for a machine similar in spirit to the Cray CX1 and capable of about 5 TFLOPs at less than 250 Watts. Including distributed storage, this platform provides an excellent workbench for exercising Chapel.

Having been a search infrastructure tech-lead at Twitter (and generally working with SoA systems) a natural application to leverage the ARM-cluster, while also exploring Chapel in the SoA capacity, is a simple Chapel-based distributed search indexing application. I will discuss this search example and will also show how shared storage, such as HDFS, can be used to train a classification model which is then used in an SoA fashion.

The programming model that Chapel utilizes is quite different than the model used in other SoA systems, such as Scala/Finagle. Using the above examples, I will highlight pros and cons of using Chapel as compared to my other experiences. Additionally, I will briefly discuss opportunities I see for using Chapel in modern Internet applications.