CIS 640 Writing in Computer Research

Types of Paragraphs

Introduction Section

Types of paragraphs

- Narration
- Description
- Definition
- Example and illustration
- Division and Classification
- Comparison and Contrast
- Analogy
- Cause and Effect
- Process

Type: example & illustration

Modifying today’s centralized schedulers to support sub-second parallel tasks presents a difficult engineering challenge. Supporting sub-second tasks requires handling two orders of magnitude higher throughput than the fastest existing schedulers [e.g., Mesos [8], YARN [16], SLURM [10]]; meeting this design requirement would be difficult with a design that schedules and launches all tasks through a single node. Additionally, achieving high availability would require the replication or recovery of large amounts of state in sub-second time.

Type: description / definition

Sparrow supports a small set of features in a way that can be easily scaled, minimizes latency, and keeps the design of the system simple. Many applications run low latency queries from multiple users, so Sparrow enforces strict priorities or weighted fair shares when aggregate demand exceeds capacity. Sparrow also supports basic constraints over job placement, such as per-task constraints (e.g., each task needs to be co-resident with input data) and per-job constraints (e.g., all tasks must be placed on machines with GPUs). This feature set is similar to that of the Hadoop MapReduce scheduler [23] and the Spark [26] scheduler.

Note the sandwich structure! Very well done sandwich.

Type: process

Sparrow introduces late binding to solve the aforementioned problems. With late binding, workers do not reply immediately to probes and instead place a reservation for the task at the end of an internal work queue. When this reservation reaches the front of the queue, the worker sends an RPC to the scheduler that initiated the probe requesting a task for the corresponding job. The scheduler assigns the job’s tasks to the first m workers to reply, and replies to the remaining \((d - 1)m\) workers with a no-op signaling that all of the job’s tasks have been launched. In this manner, the scheduler guarantees that the tasks will be placed on the m probed workers where they will be launched soonest.

Type: compare & contrast /example

While Sparrow’s design allows for scheduler failures, Sparrow does not provide any safeguards against rogue schedulers. A misbehaving scheduler could use a larger probe ratio to improve performance, at the expense of other jobs. In trusted environments where schedulers are run by a trusted entity (e.g., within a company), this should not be a problem; in more adversarial environments, schedulers may need to be authenticated and rate-limited to prevent misbehaving schedulers from wasting resources.
Confusing paragraphs from Steffen

- Hard to find topic sentence
- Hard to identify the type of paragraph
- Both paragraphs mix Steffen with other methods
- Very confusing - first paragraph almost reads as if the Steffen method involves “boarding from rear window seats row-by-row to the front aisle seat”.
- HW4 assignment – fix these two paragraphs

Introduction Section
- Introduction: crucial, formulaic
- if reader not excited by intro, paper is lost
- recipe:
  - para. 1: motivation: broadly, what is problem area,
  - why important?
  - para. 2: narrow down: what is problem you specifically consider
  - para. 3: “In the paper, we …”: most crucial paragraph, tell your elevator pitch
  - para. 4: how different/better/relates to other work
  - para. 5: “The remainder of this paper is structured

In-class Exercise
- Analyze the paragraphs in the Introduction to several of the Best Papers
  1) Highlight topic sentences
  2) Indicate type of each paragraph
  3) Evaluate quality of writing