Yandex

Execution & scheduling

SparkContext

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- Coordinates processes on the cluster to run your application

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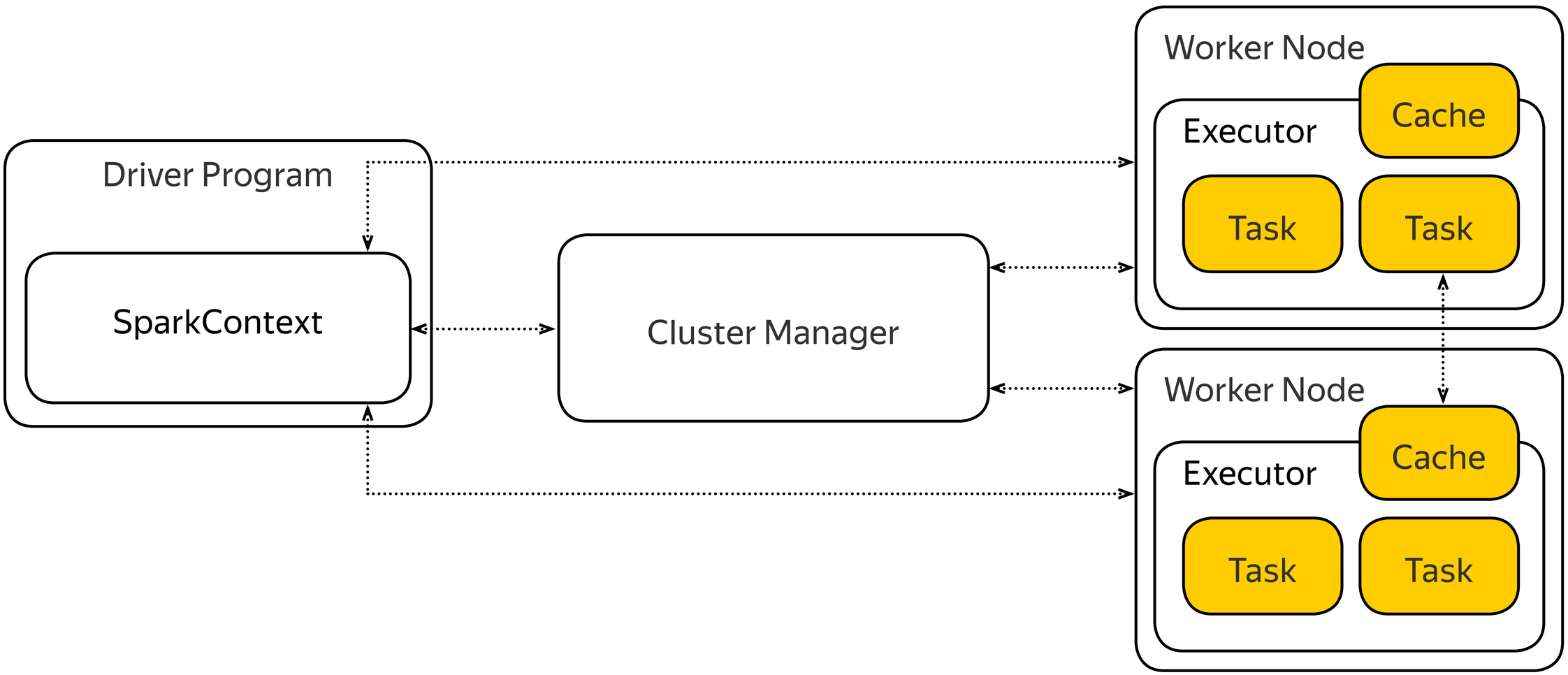

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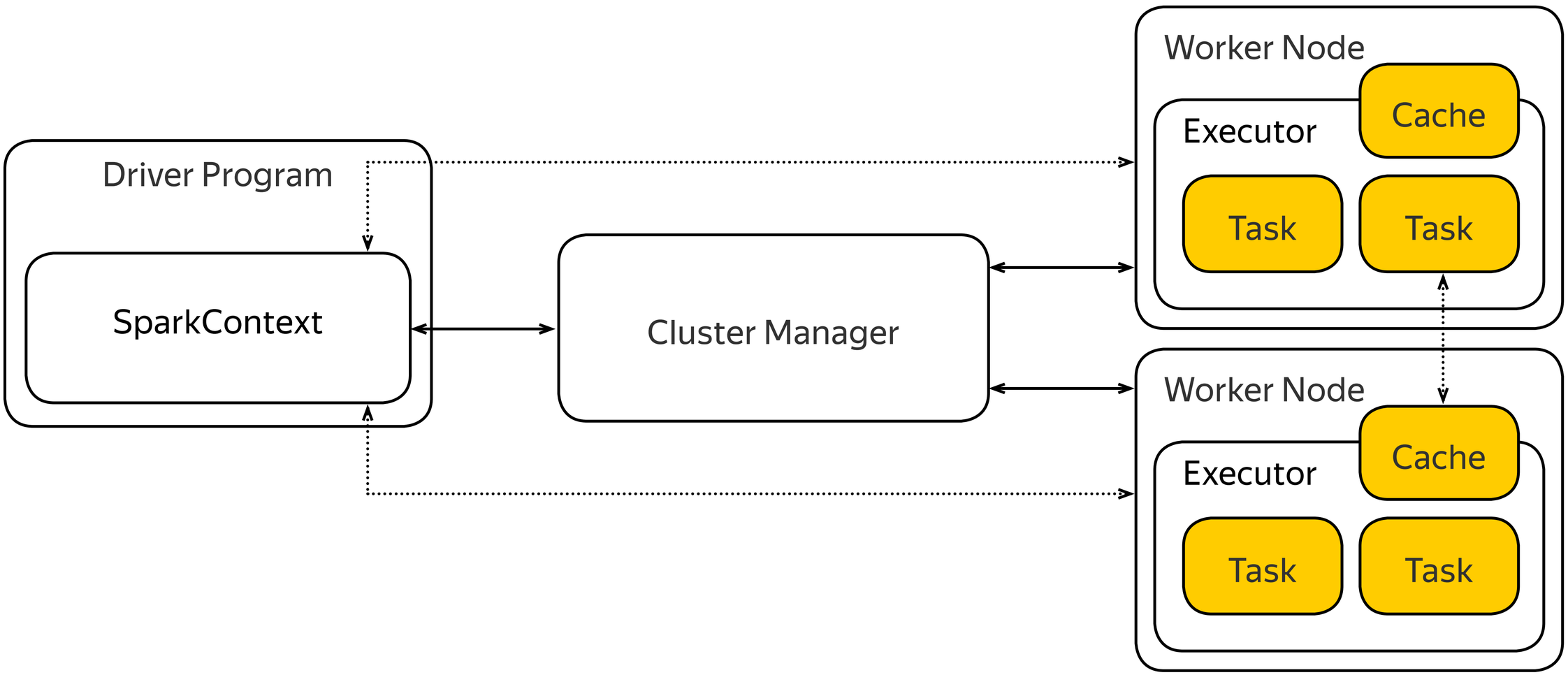

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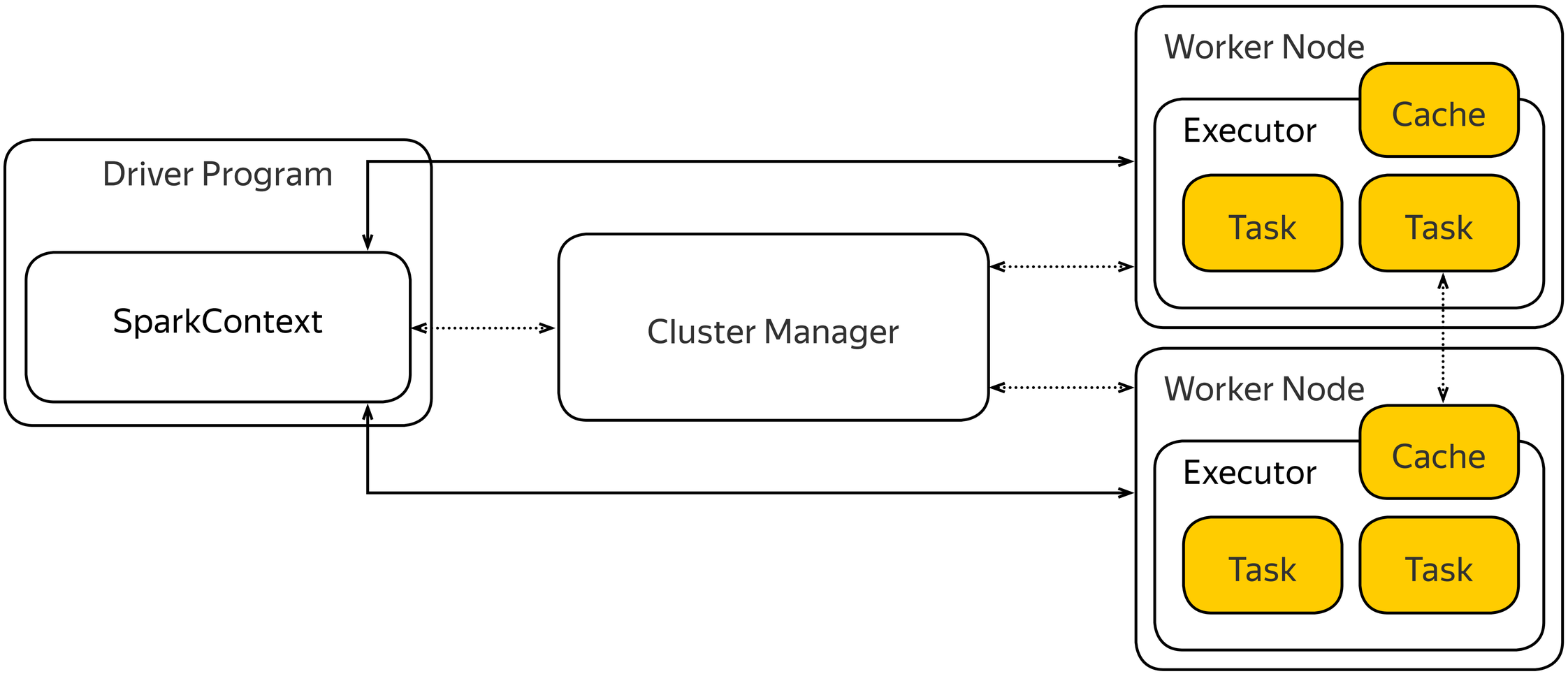

Jobs, stages, tasks

- Task is a unit of work to be done
- Tasks are created by a job scheduler for every job stage
- Job is spawned in response to a Spark action
- Job is divided in smaller sets of tasks called stages

Jobs, stages, tasks (example)

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.map(lambda x: (x % 10, x / 10))
.reduceByKey(lambda x, y: x + y)

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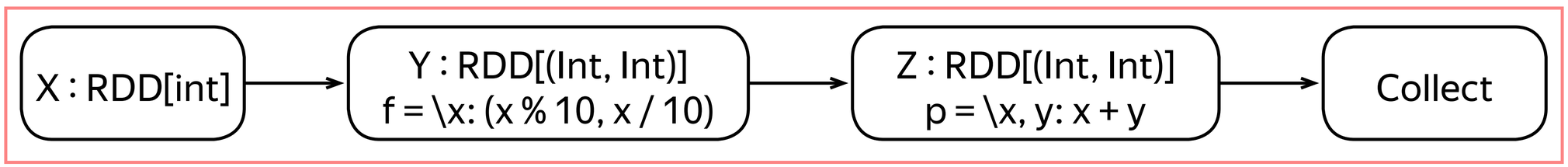

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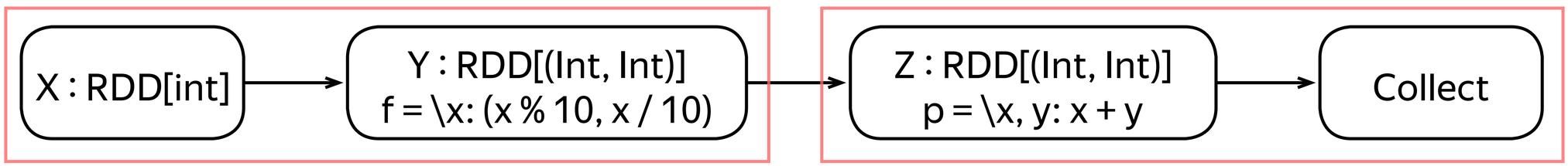

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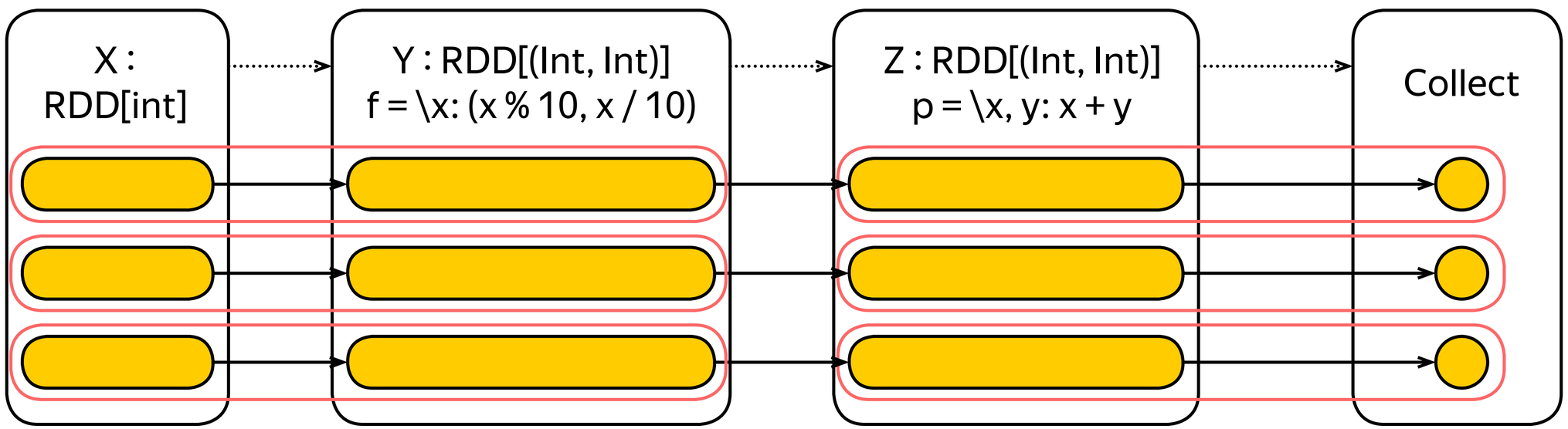
1. Invoking an action...
2. ...spawns the job...
3. ...that gets divided into the stages by the job scheduler...
4. ...and tasks are created for every job stage.



Jobs, stages, tasks

- Job stage is a pipelined computation spanning between materialization boundaries
  - not immediately executable
- Task is a job stage bound to particular partitions
  - immediately executable

Jobs, stages, tasks

- Job stage is a pipelined computation spanning between materialization boundaries
- Task is a job stage bound to particular partitions
- Materialization happens when reading, shuffling or passing data to an action
  - narrow dependencies allow pipelining
  - wide dependencies forbid it

SparkContext – other functions

- Tracks liveness of the executors
  - required to provide fault-tolerance
- Schedules multiple concurrent jobs
  - to control the resource allocation within the application
- Performs dynamic resource allocation
  - to control the resource allocation between different applications

Summary

- The SparkContext is the core of your application
- The driver communicates directly with the executors
- Execution goes as follows:
  Action ➞ Job ➞ Job Stages ➞ Tasks
- Transformations with narrow dependencies allow pipelining

BigDATAteam