EVALUATE THE DASK DISTRIBUTED COMPUTING FRAMEWORK IN RESPECT TO VARIOUS SCIENTIFIC COMPUTING TASKS

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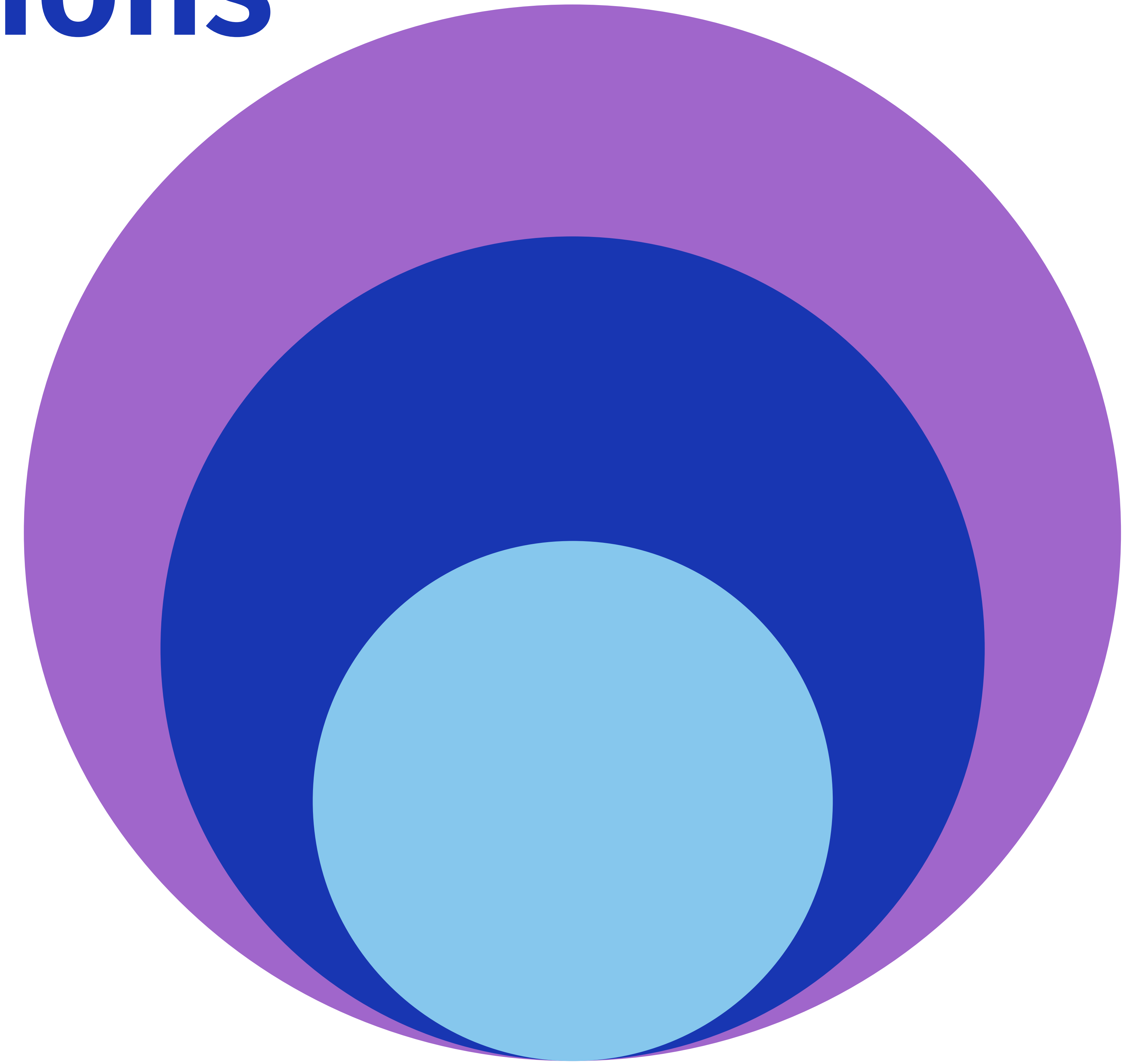
The Research Questions

- **How DASK's parallel and out-of-core computation extends the effective scale of modern hardware to larger datasets?**

- **How these ideas can be more broadly applied to other parallel collections?**

- **How the DASK performs on various scientific computing tasks?**
  - such as Average Global Ocean Temperature 36 year's worth



About Dask

A flexible library for parallel computing in Python.

Is composed two parts:

1

Dynamic task scheduling

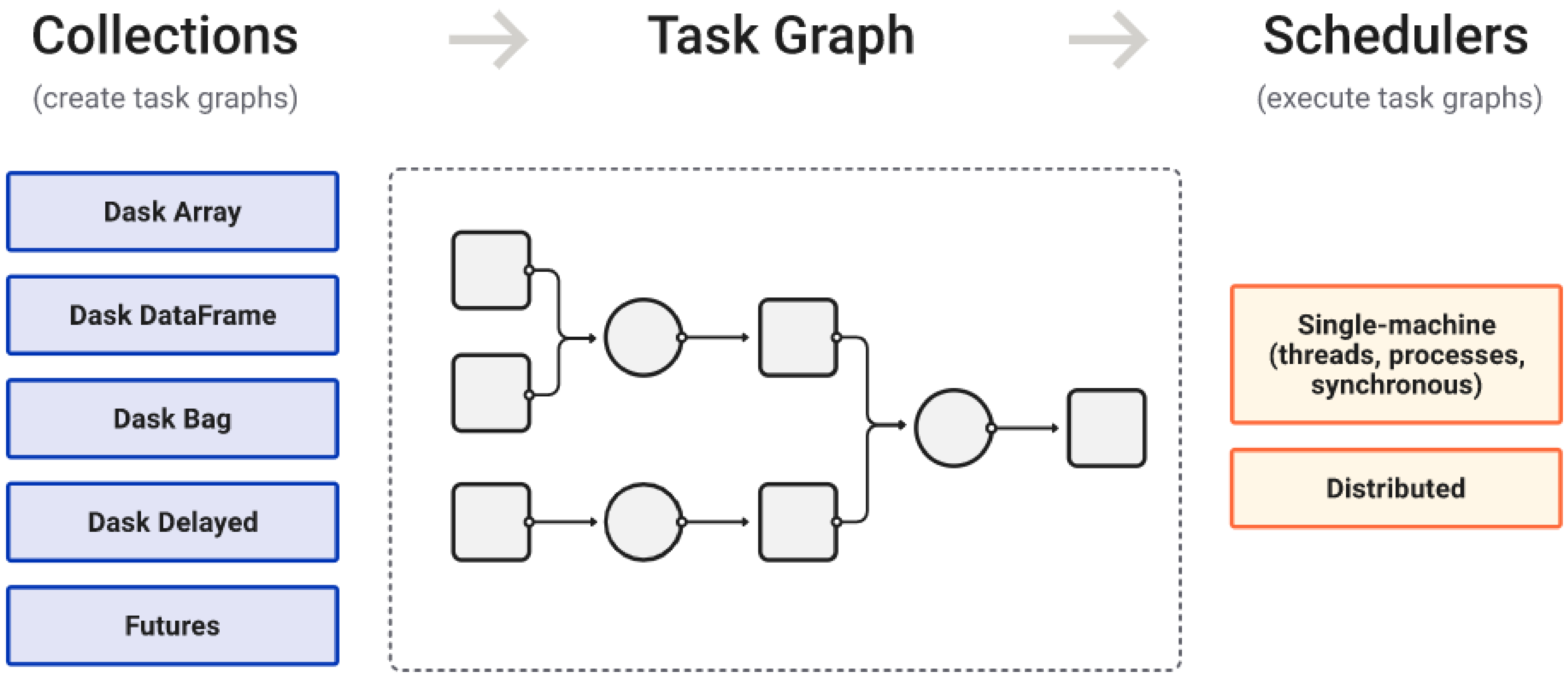
- optimized for computation
- *similar* to Apache Airflow, Luigi Workflow, *but* optimized for interactive computational workloads

2

“Big Data” collections

- contains parallel arrays, dataframes, and lists that extend common interfaces like NumPy, Pandas, or Python iterators to larger-than-memory or distributed environments

Dask Architecture



Collections

(create task graphs)

Task Graph

Schedulers

(execute task graphs)

Dask Array

Dask DataFrame

Dask Bag

Dask Delayed

Futures

Single-machine (threads, processes, synchronous)

Distributed

High level collections are used to generate task graphs which can be executed by schedulers on a single machine or a cluster.

Source: https://docs.dask.org/en/stable/

References

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[3] Performance Evaluation of Python Based Data Analytics Frameworks in Summit: Early Experiences

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[4] A Performance Comparison of Dask and Apache Spark for Data-Intensive Neuroimaging Pipelines

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