# Introduction to Apache Mesos

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# What is Mesos?

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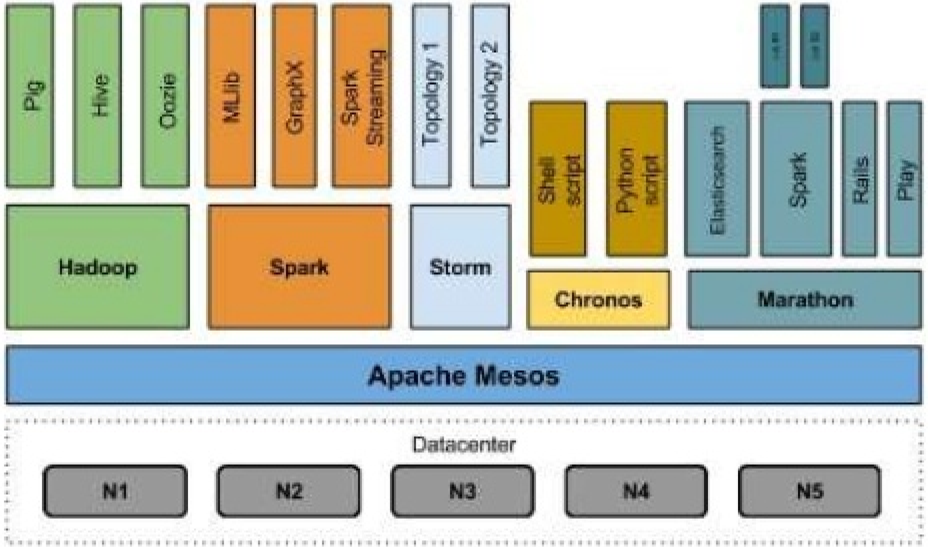

# What is Mesos?

- is a cluster manager that provides efficient resource isolation and sharing across distributed applications or frameworks.

- Open source

- sits between the application layer and the operating system and makes it easier to deploy and manage applications in large-scale clustered environments more efficiently

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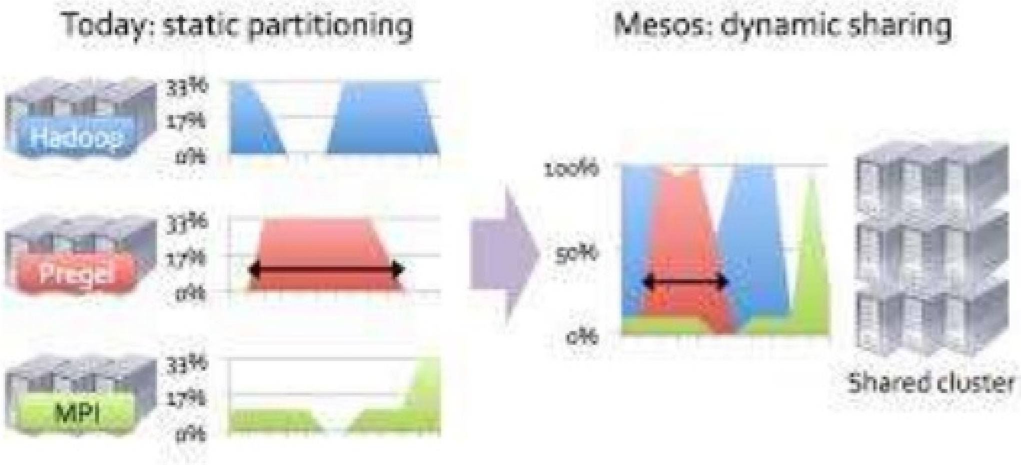
# Benefits

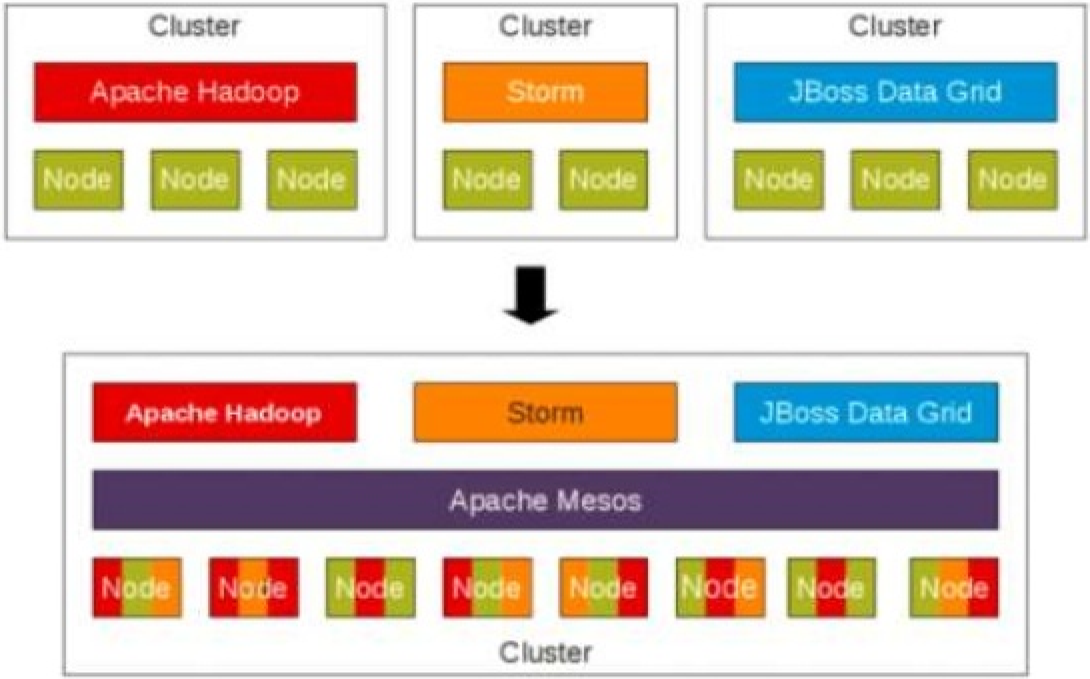
- leverages features of the modern kernel—"cgroups" in Linux
- provides isolation for CPU, memory, I/O, file system, rack locality, etc.
- introduces a distributed two-level scheduling mechanism called resource offers.
- decides how many resources to offer each framework, while frameworks decide which resources to accept and which computations to run on them
- The idea is to deploy multiple distributed systems to a shared pool of nodes in order to increase resource utilization.
- it could easily switch resources away from framework1 (for example, doing big-data analysis) and allocate them to framework2 (for example, a web server)
- is essentially data center kernel—which means it's the software that actually isolates the running workloads from each other.

# Components

- **Chronos scheduler**, a cron replacement for automatically starting and stopping services (and handling failures) that runs on top of Mesos.
- **Marathon** that provides API for starting, stopping and scaling services (and Chronos could be one of those services).



# Example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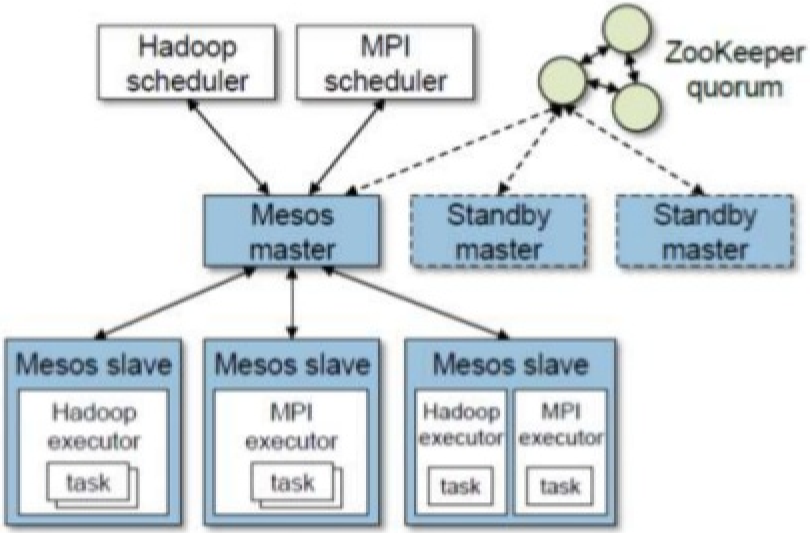
Cluster

# Architecture

- consists of a master process that manages slave daemons running on each cluster node, and frameworks that run tasks on these slaves.
- The master implements fine-grained sharing across frameworks using resource offers.
- Each resource off
- The master decide n organizational policy, such as fair sharing or priority.



# Components

- a **scheduler** that registers with the master to be offered resources
- an **executor** process that is launched on slave nodes to run the framework's tasks.
- the master determines how many resources to offer to each framework
- the frameworks schedulers select which of the offered resources to use

# Features

Fault-tolerant replicated master using ZooKeeper

Scalability to thousands of nodes

Isolation between tasks with Linux containers

Multi-resource scheduling (memory and CPU aware)

Java, Python and C++ APIs for developing new parallel applications

Web UI for viewing cluster state

# Use Cases

- Hadoop on Mesos
- Spark on Mesos
- Storm on Mesos
- Jenkins on mesos
- Dockers on mesos
- Scaling architecture of your app
- Parallel programing (c++ API exits)