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Title of the Copyright:

"I/O monitoring framework for High Performance Computing Systems"

Copyright Description:

The block diagram fig 1.a and fig 1.b explains the inner workings of the I/O monitoring framework for HPC systems which aims to collect a number of I/O metrics. Detailed walkthrough of the framework is elaborated in the steps as follows:

Algorithm / Walkthrough of the metrics acquisition process:

1. Data from a particular node is extracted via utilizing a set of specialized tools (mentioned in the table 1) through the Linux kernel
2. The set of certain selected specialized tools (see table 1) together form the *metrics collector*
3. The *metrics collector* is responsible for dumping the data into the local data cache (fig 1.a)
4. The local data cache is made up of *Memcached* - Free & open source, high-performance, distributed memory object caching system
5. Further at a set interval the data from the *local data cache* is dumped into the *database* (see fig 1.b)
6. The *Database* mentioned here can be local or hosted online to provide flexibility to the system and make it easy to create multiple backups from logged data
7. Later the *Database* is connected to a visualization tool – which could be either Grafana or any other visualization tool chosen by the user (see fig 1.b)
8. The system aims to be modular in design without sacrificing performance

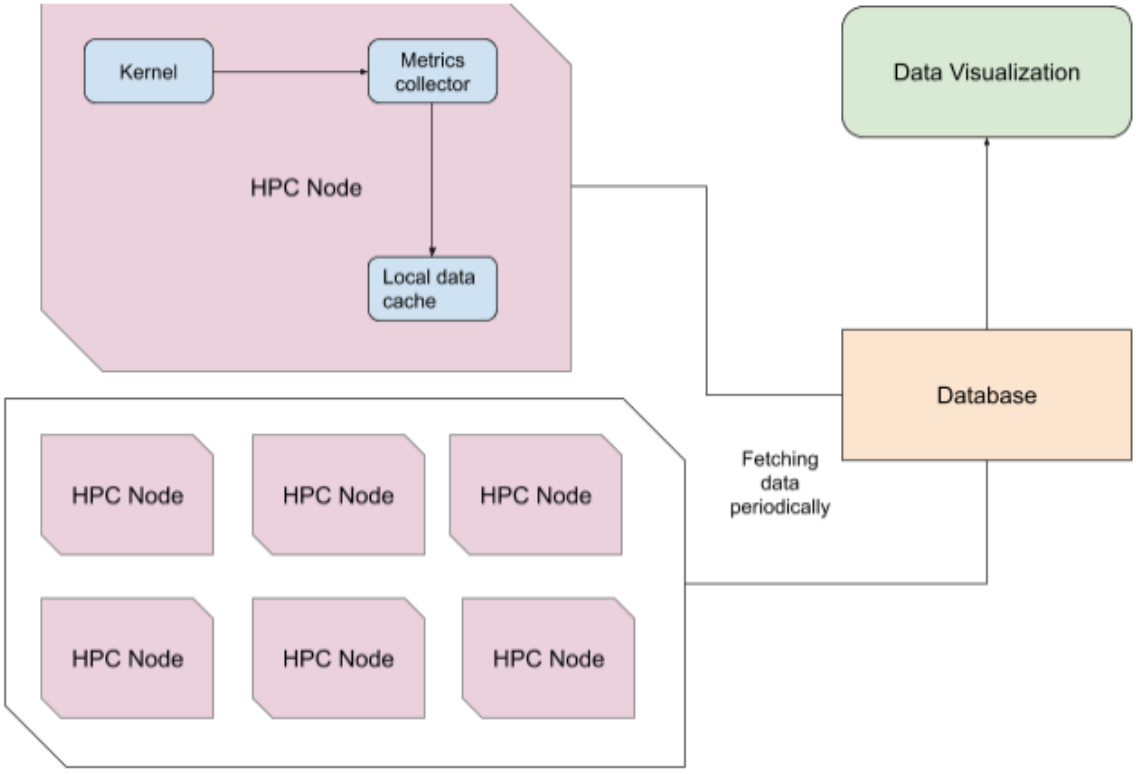
Kernel
Metrics collector
HPC Node
Local data cache
Data Visualization
Database
HPC Node
HPC Node
HPC Node
HPC Node
HPC Node
HPC Node
Fetching data periodically

Fig 1.a

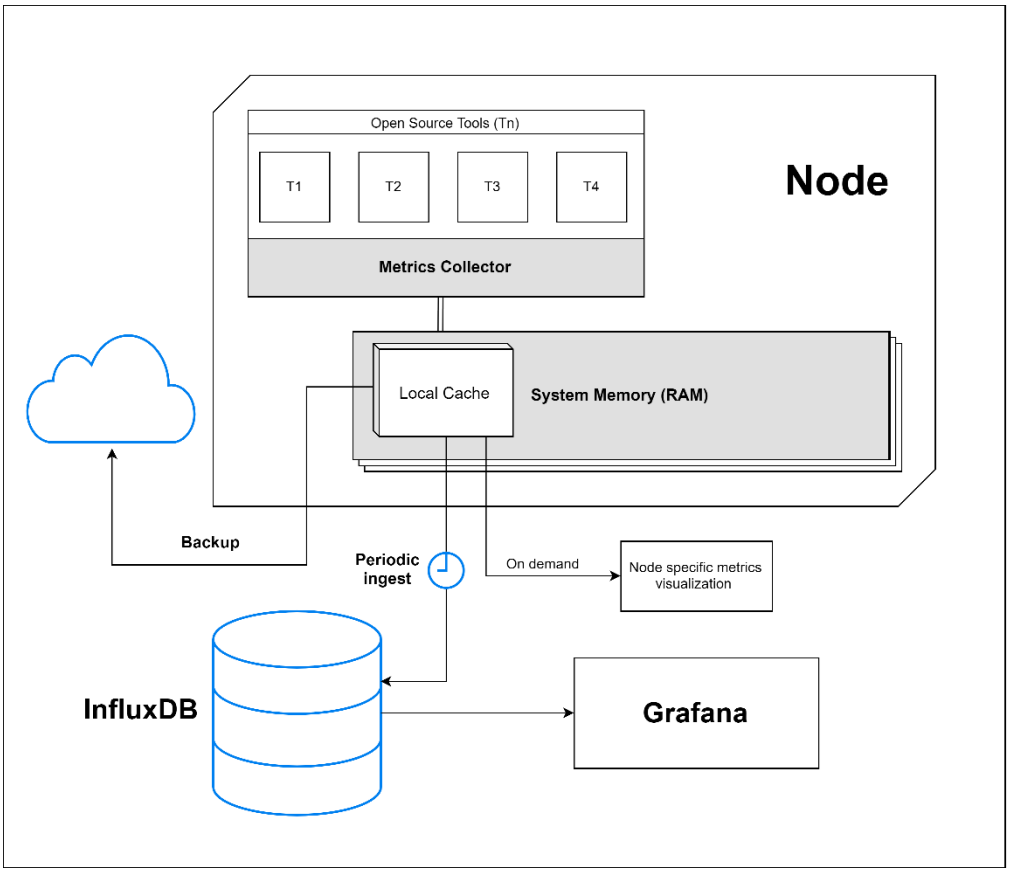
Open Source Tools (Tn)
T1
T2
T3
T4
Metrics Collector
Node
Local Cache
System Memory (RAM)
Backup
Periodic ingest
On demand
Node specific metrics visualization
InfluxDB
Grafana

Fig 1.b

No.	Names	Metrics
1.	bitesize	Block I/O size Distribution
2.	cachestat	cache hit/miss (ratio)
3.	iolatency	Latency distribution, Block I/O queue time
4.	iosnoop	PID, BLOCK I/O, Bytes, Latency, Type of action

Table 1