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Flexible I/O Monitoring for Distributed Systems

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Motivation

- Developing, configuring and managing distributed systems are difficult, costly and challenging tasks.
- Tracing and analysis frameworks provide insights into how the systems' state evolves over time.
- Key for performance, correctness and security analysis.

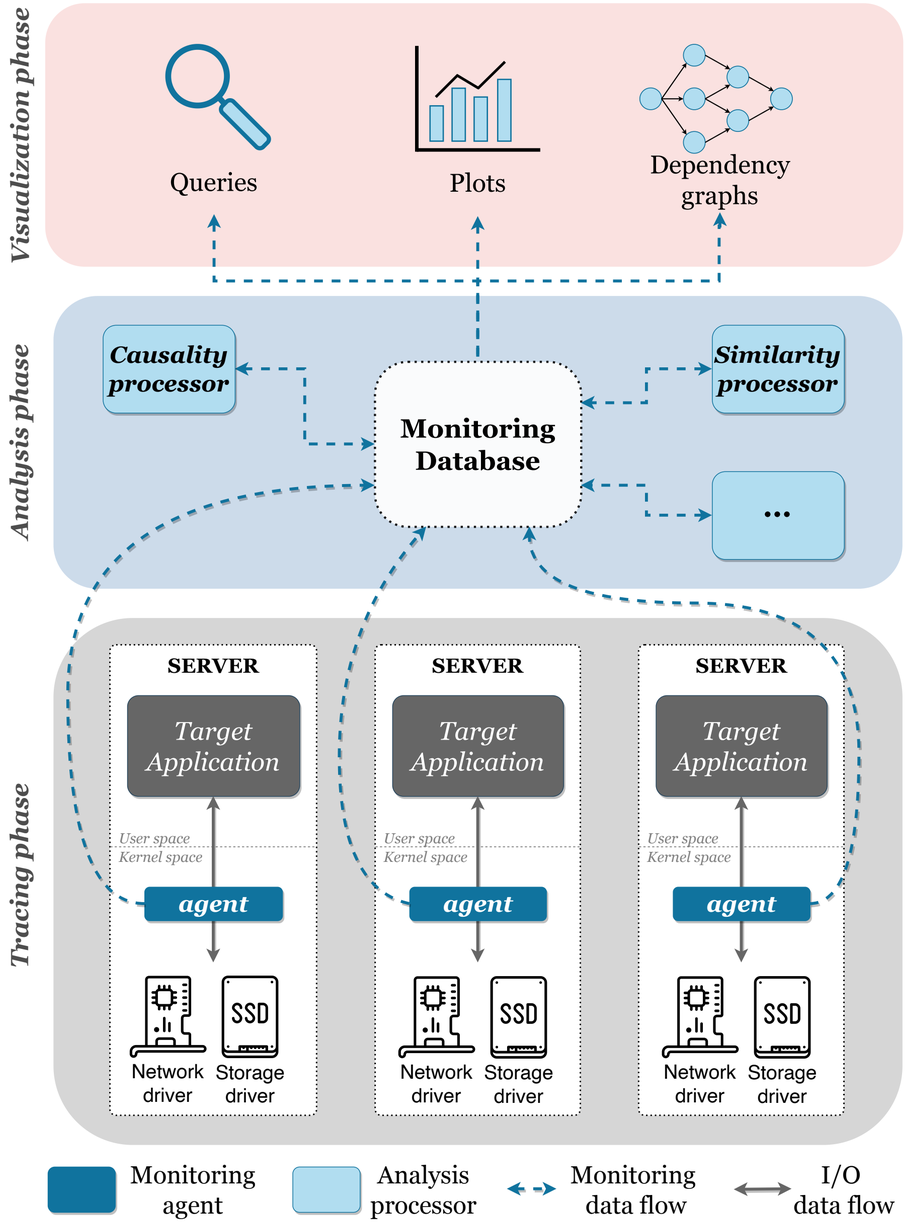
Problem

Current solutions suffer from several limitations:

- Intrusiveness (require instrumentation).
- Significant performance and storage overheads.
- Disregard of events' content.
- Lack of mechanisms to automatically analyze the tracing information.

Proposed solution

A novel content-aware monitoring solution to analyze the data flow of distributed systems in a non-intrusive way.

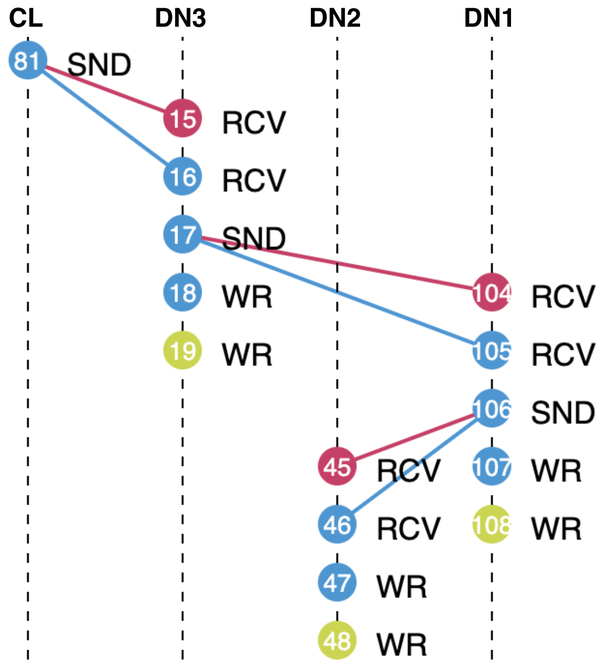


CAT: Content-aware tracing and analysis for distributed systems

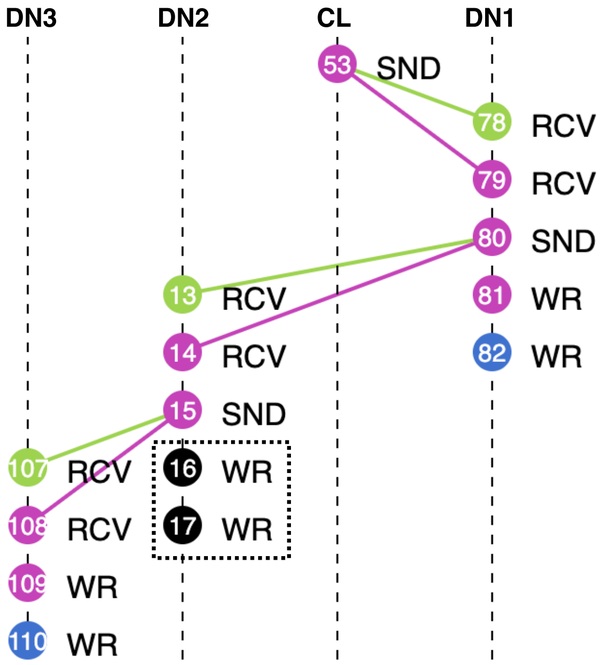
- By supporting different tracing tools, CAT can balance the coverage of captured events with the impact on applications' performance.
- Depending on the applications' workload, full coverage of events can be attained with negligible performance and storage overheads.
- CAT can pinpoint correctness and dependability flaws that are not visible when using context-based state-of-the-art tools and are not detected by the integrity mechanisms of the applications.

 *dsrhaslab/cat*  *https://doi.org/10.1145/3464298.3493396*

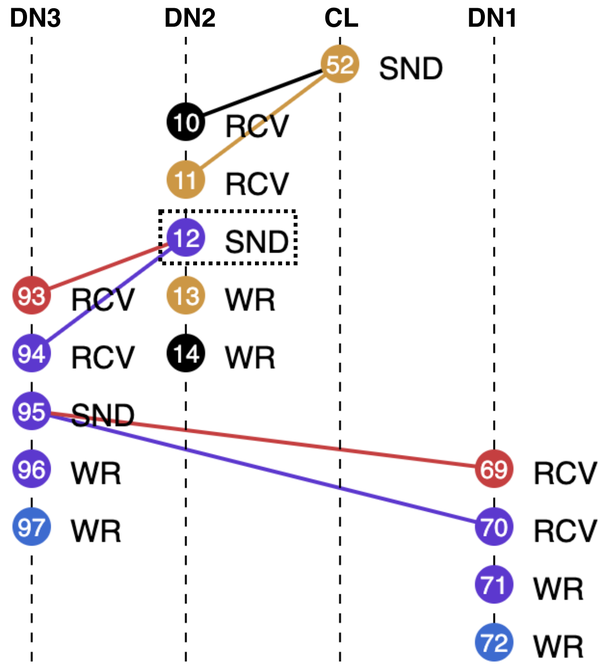
HDFS file replication



(a) normal execution



(b) storage corruption



(c) network corruption

Validation of correct behavior

Identification of irregular behavior

Future work

- Improve the performance of the analysis processors.
- Provide a near-real-time solution.
- Allow the execution of queries and dynamic visual representations.