Week 12

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1. All File Systems Are Not Created Equal: On the Complexity of Crafting Crash-Consistent Applications (OSDI'14)

Many applications use application level consistency protocol atop file system to guarantee their data's consistency. However, application level consistency protocol highly depends on the underlying file system. Because the persistence properties of file system influence to application's consistency strategy variously, even when same property is set, this paper developed a new tool, called BOB (Block Order Breaker). BOB can test these various properties among six Linux file systems. And this paper proposed a novel framework called ALICE that found crash vulnerabilities. Alice found 60 vulnerabilities that leads to serious results. I think this paper discover consistency problem of many applications, such as database. However, I think it needs specific solution about vulnerabilities. So, I propose specific solution about file system vulnerabilities that affect application's consistency strategy.

2. TxFS: Leveraging File-Systems Crash Consistency to Provide ACID Transactions (ATC'18)

To guarantee consistency, many applications, such as database, key-value store etc., stores data by using application level file system. However, most of techniques for data consistency result in various protocol bugs. So, this paper proposes a novel transactional file system, called TxFS. TxFS could provide many functions: a simple API, portability across different architecture, high performance, low complexity, and ACID transactions. I think this transactional file system is very good idea. I don't know if the API is simple when I actually used. So, in practical terms, I propose specific documentation to make use easier for developers.