# Toward Trustworthy Mutable Replay for Security Patches
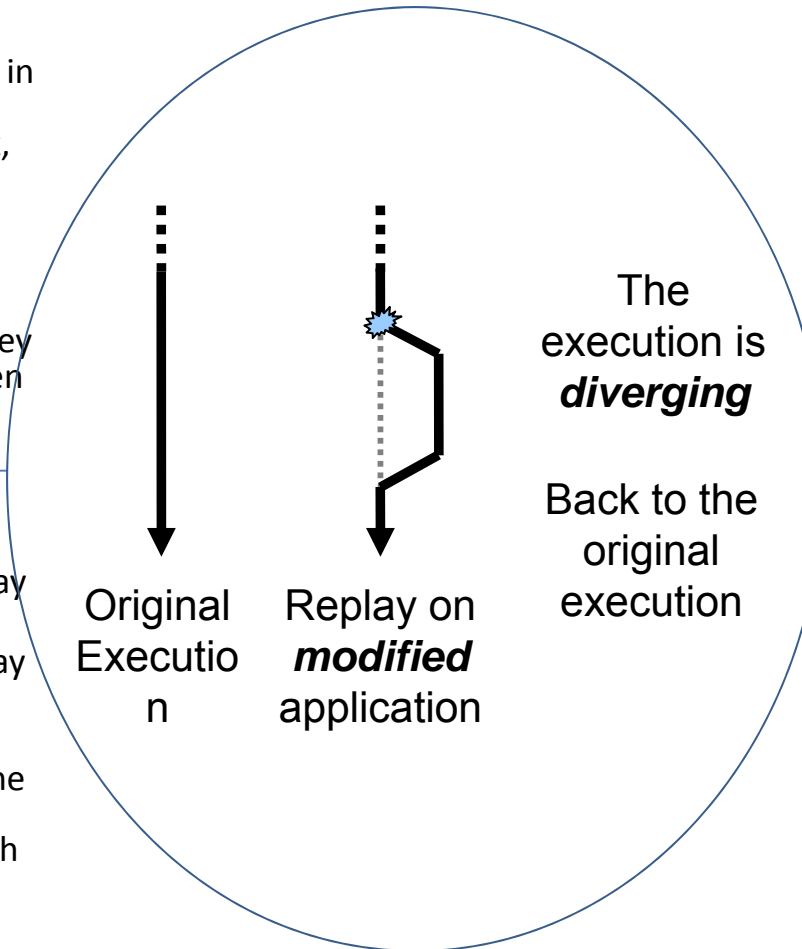
**Challenge:**
- To fix a security vulnerability discovered in the wild, we need to reproduce, diagnose, fix, and validate the fix
- How do we validate the fix?
- Our original test cases didn't find the bug, if they did it wouldn't have been deployed

**Solution:**
- We can use record/replay to reproduce
- Can we use record/replay to validate?
- Use static and dynamic analyses to transform the recorded log to enable sound replay+golive with modified application

Original Execution

Replay on *modified* application

The execution is ***diverging***

Back to the original execution

**Scientific Impact:**
- Simplifies and hastens generation and validation of security patches
- Novel use cases for static and dynamic program analyses

**Broader Impact:**
- Users can check the issued patch on their own configurations and workloads before adopting
- Faster adaptation to protect the public