Ovum
TMT intelligence | informa

On the Radar: Undo Live Recorder helps teams improve software quality by capturing and fixing hard to reproduce bugs

Providing software accountability in complex systems to find and fix problems quickly

Summary

Catalyst

Most software running today, perhaps with the exception of safety-critical systems, isn't well understood. No one really knows what's under the covers and what's happening at any given moment, and the trend toward microservices architecture increases the complexity. When trying to resolve issues with this software, there would be tremendous value in knowing what is happening at the execution of each line of code and the opportunity to determine the business consequences of decisions made by the software as it goes through each step of its logic.

Undo offers technology that gives total visibility into what software does. Its recording technology, Live Recorder for Automated Test, and its interactive reversible debugger, UndoDB, deliver the ability to record a software program's execution and precisely replay it forward and/or backward for analysis or diagnosis. This capability helps teams improve software quality by capturing and fixing, for example, hard to reproduce bugs, and has the potential to be a huge advantage when dealing with regulatory compliance, and resolving security breaches and other cases where knowing what actually happened during execution is a critical issue.

Key messages

- Undo records the non-deterministic inputs such as network and disk traffic and key variables in a rolling buffer of recorded events that can be replayed at a future time.
- Undo offers the ability to generate an exact replica of a program's execution that can be loaded on a separate machine.
- It has a slowdown of 2x–5x while recording mode is on. Undo aims to improve this to be able to "always record" software for any application within two years.
- It supports C/C++ on Linux, and the roadmap includes Java and other language support in the next year.

Ovum view

Having an exact replica of a failed test has a number of advantages for quality assurance (QA) and development teams, not least that when a test fails, QA has an exact recording of the failure as it happened. This removes the need to reproduce failing tests, which can be very time-consuming and expensive, particularly in the case of intermittent failures.

For developers, analyzing this exact replica in a reversible debugging session allows them to zero in on the root cause of the failure more quickly and easily than before. They do not need to rely on speculative logging or breakpoints to stumble across the issue, but can step backward through the code to see how the failure unfolded and can find the root cause.

By positively impacting both the development and QA aspects of the delivery cycle, time to market is reduced and software quality is improved.

There will always be some speed penalty and nontrivial storage requirements for recording. But for many applications, Ovum would argue that concerns such as reliability, auditability, and security outweigh raw performance overhead.

Recommendations for enterprises

Why put Undo on your radar?

The persistence of bugs, even in an automated DevOps world, comes from a combination of factors inherent to the testing process.

Tests that are known to fail or ones that fail intermittently and are hard to reproduce can lead to a backlog of failing tests that build up over time, especially as the code base becomes larger or more complex.

In addition, the cost of reproducing errors is high, and combined with the potential friction between QA and development teams tasked with fixing the failure means that some issues slip through the cracks and cannot be addressed to meet release targets.

Organizations where this scenario is prevalent will get significant assistance through from the use of Undo. Ovum believes that any institution attempting to implement a DevOps strategy will immediately see the value that Live Recorder for Automated Test represents in closing the loop between QA and development.

Highlights

Live Recorder for Automated Test records all or part of the execution of a test run for subsequent analysis. Failing tests generate a recording which contains all of the information necessary for debugging and analyzing the failure.
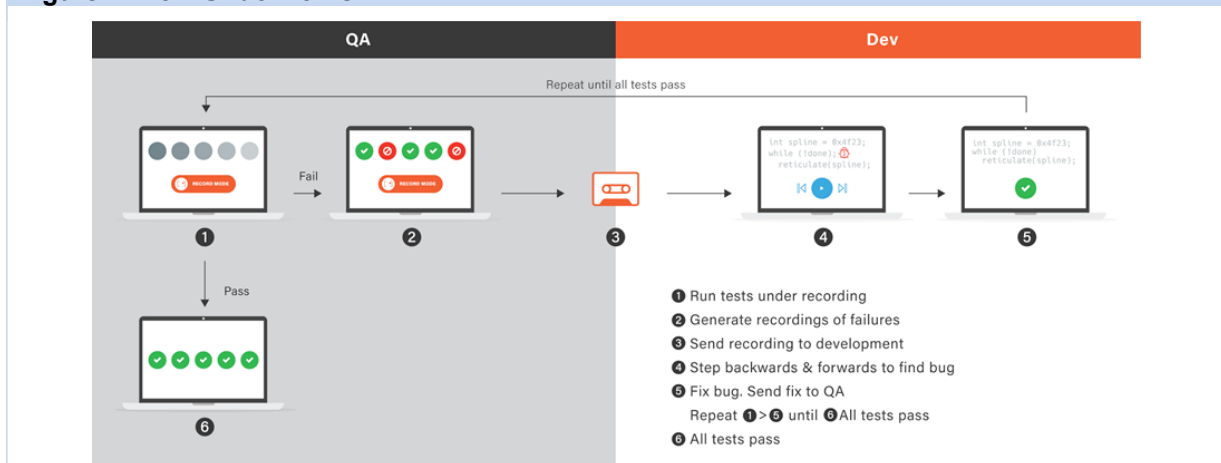
Using UndoDB, the reversible debugger for Linux, developers can load recordings and debug them on a separate machine, and even share recordings to enable collaborative debugging of the same problem.

The ability to generate a replica of a program's execution that can be loaded on a separate machine is a significantly new approach. Programmers have the ability to go back in time and see the value of any memory location (and any register) at any moment in their program's execution history.

Using Live Recorder

QA teams can set up Live Recorder to record all their tests as they run, or rerun failing tests under recording in order to generate an exact replica of a test failure. This replica can be copied, shared, emailed, or downloaded by anyone in the organization and loaded into UndoDB, allowing them to step through the failure that occurred and see how it happened down to the line of code at fault or instruction that caused the bug.

Figure 1: How Undo works

Source: Undo

Undo provides its technology in three different forms:

- **Live Recorder for Production** records the execution of an application as it failed in production and/or at the end customer site, giving Undo's customers all the information they need to fix the problem either in the field or back at base.
- **Live Recorder for Automated Test** allows customers to capture, identify, diagnose, and respond to the failures exposed by their test suites, including continuous integration, therefore making intermittent failures 100% reproducible.
- **UndoDB** is provided as a standalone product, an interactive reversible debugger. Bundled with Live Recorder, it provides a playback and diagnosis tool for captured recordings.

Background

Founders Greg Law (CEO) and Julian Smith (CTO) met while working at British computer firm Acorn. They went on to create the technology that underpinned Undo, and in 2012 Law left his job to work full time on Undo. As CEO, he has overseen the company as it transitioned from the shed in his garden to a significant business, while Smith focused on development and innovations. Funded originally by angel funding, Undo closed a Series A funding round of $3.3m in October 2016.

Current position

Undo has 26 full-time staff based primarily in Cambridge, UK, and also has a small office in the Bay Area. Undo will continue building its UK and US presence over the next few years.

Highlights to date include that 60+ engineering years have been invested in development. Two patents have been granted, three are pending, and others are in process. Undo has built a proprietary JIT binary translation engine that supports all x86 and ARM (32-bit and 64-bit) architectures, with full Linux OS syscall intercept and replay (of Shared memory, async IO, and so on).

Revenues have grown tenfold over the past five years, and are on track to more than double in 2017 with 125% growth in four out of the past five years, and a 97% renewal rate.

Key companies using Undo include SAP, which uses it to develop and test software for its customers. Other customers include Cadence IBM, Citadel, Commvault, Daimler, LG, ARM, and Micro Focus. Technology partners include Rogue Wave, ARM, and Micro Focus.

Short-term future

Undo is aiming to expand its offering in the test space in conjunction with customer demand. It believes there is a market and a hunger within the DevOps community to be able to analyze and extract more data from test infrastructure, and Undo is optimizing Live Recorder's functionality to achieve this. This is in conjunction with improving the performance of the software and increasing the number of supported languages.

Longer term

Undo intends to be a pioneer in the field of software accountability. It wants to improve the performance of its recording technology in order to switch to always-recording the execution of software, whether in test or in production. This is aimed at organizations that require auditability or accountability for the decisions made by their software, be it banks and trading, or artificial intelligence in self-driving cars and other devices.

Data sheet

Key facts

Table 1: Data sheet: Undo

Product name	Live Recorder, UndoDB	Product classification	Software Quality Tool
Version number	4.x	Release date	01/2015, with one minor release every two weeks, larger releases around once per year.
Industries covered	Software development, deployment, and testing	Geographies covered	Global
Relevant company sizes	Small to large	Licensing options	1-year term
URL	http://undo.io	Routes to market	n/a
Company headquarters	Cambridge, UK	Number of employees	26

Source: Ovum

Appendix

On the Radar

On the Radar is a series of research notes about vendors bringing innovative ideas, products, or business models to their markets. Although On the Radar vendors may not be ready for prime time,

they bear watching for their potential impact on markets and could be suitable for certain enterprise and public sector IT organizations.

Author

Martin Gandar, Associate Senior Analyst

Michael Azoff, Principal Analyst, Infrastructure Solutions

michael.azoff@ovum.com

Ovum Consulting

We hope that this analysis will help you make informed and imaginative business decisions. If you have further requirements, Ovum's consulting team may be able to help you. For more information about Ovum's consulting capabilities, please contact us directly at consulting@ovum.com.

Copyright notice and disclaimer