

---

# Cadence Design Systems

Finding customer-critical bugs  
with Live Recorder for Production

## The challenge - improve productivity in complex software environments

Cadence Design Systems, Inc (NASDAQ: CDNS) enables global electronic design innovation and plays an essential role in the creation of today's integrated circuits and electronics. Customers use Cadence® software, hardware, IP, and services to design and verify advanced semiconductors, consumer electronics, networking and telecommunications equipment, and computer systems.

At the heart of Cadence's success is a commitment to quality that ensures its customers can meet their development goals, creating their increasingly complex electronic products in ever-decreasing timeframes.

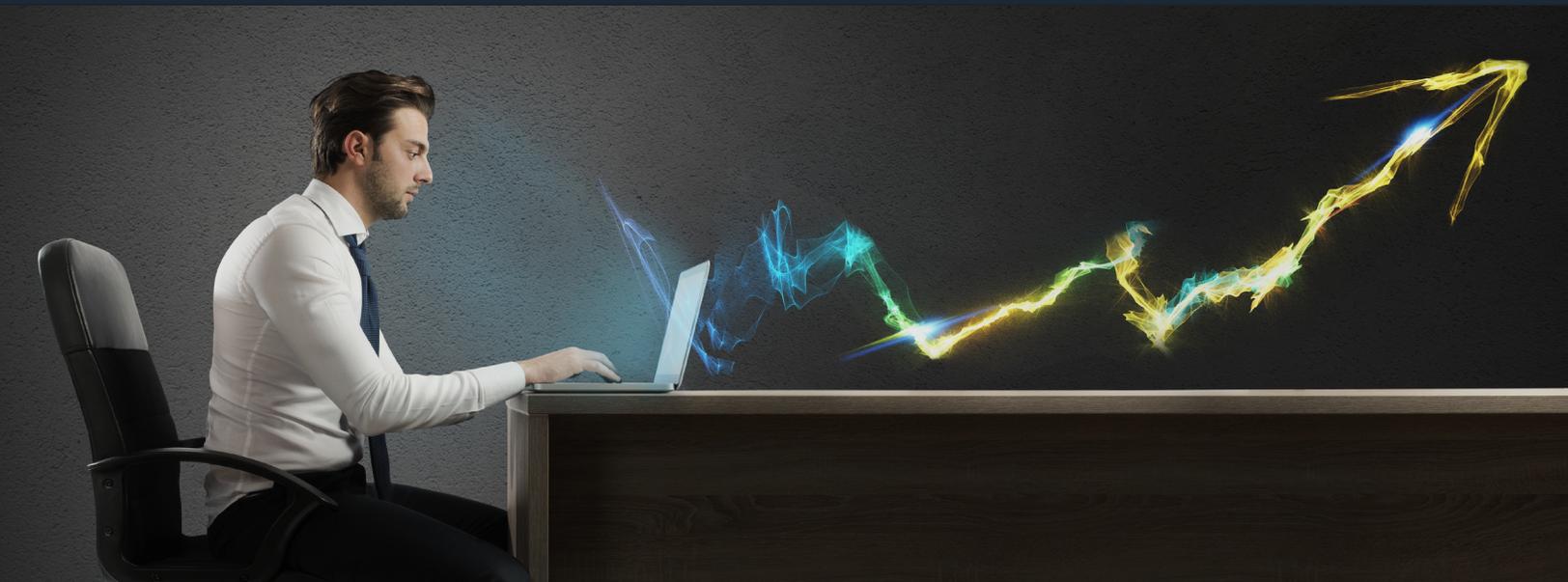
Cadence's Advanced Verification Solutions (AVS) business unit, part of the System & Verification Group, works with customers to verify their designs before they are committed to silicon using the Incisive® functional verification platform. It comprises hundreds of developers, situated in the US and India.

Operating with complex code, large memory-intensive applications, and challenging customer timeframes, the AVS team is continually looking for ways to improve productivity and speed up customer time to market.



"We operate in a very complicated environment. Essentially, at the heart of our platform is a compiler that has been developed over 20 years by hundreds of engineers. Customer code in any one of five specific languages feeds into this for testing and verification. As the next step is to produce physical chips, debugging is vital, and we are continually looking for tools that deliver greater insight into code, improve productivity and help us track down any bugs quickly and efficiently."

— **Andy Eliopoulos** / Vice President, Advanced Verification Solutions, System & Verification Group.



## Solution – Capturing intermittent failures with Out-and-About\* and reversible debugging with UndoDB

---

After hearing about Undo’s UndoDB the Cadence AVS team evaluated the tool and then deployed it to enhance their productivity and have total visibility into their software. UndoDB is a reversible debugging tool that enables developers to record, rewind and replay their code to respond quickly to customer critical bugs, increase their productivity and meet their development deadlines.

“When tracking down bugs, we need to gain insight into the code that we are debugging – traditional tools helped, but we needed a deeper level of understanding to solve extremely difficult problems that potentially affect our customers. We immediately saw value in UndoDB after our trial use so we rolled it out to developers in both the US and India.”

— Jonathan DeKock / Senior Architect, Cadence

Cadence was able to integrate UndoDB into its existing working practices as it is fully compatible with the open source debugger GDB, which was already in use within the team. This reduces learning time, as DeKock explains, “Any user on GDB can use UndoDB as they don’t have to change how they work, just learn a few new commands.”

As well as within its own offices, Cadence also needed the ability to debug code on customer sites. Given the highly confidential, mission-critical nature of customer designs, they can only be run on the customer’s servers and cannot be transferred off-site. “We worked with Undo closely and they developed Undo Out-and-About\*, which is capable of recording all or part of a program’s execution for subsequent analysis and could be easily installed and run on customer servers. This was part of a very impressive level of responsiveness from the Undo team – as engineers we know how complex updating software and ensuring peak performance is, so we really valued their speed and close working relationship,” says DeKock.

\*Out-and-About is now part of Live Recorder for Production



## Benefits - solving the impossible problems

On one customer site, Cadence was faced with an intermittent, yet potentially serious, bug in its compiler which was being used to develop a design for a new chip. Given that this compiler is used by multiple customers, and the client had tight deadlines, it was business critical that the bug was tracked down.

*“Our engineer had spent months struggling to try and track down the problem,” says DeKock. “It only struck in 1 in 300 runs, making finding it like looking for a needle in a haystack. We’d been using GDB, but that didn’t let us see what had caused the problem, as when the code failed we were so far past the point of failure that we couldn’t find the source of the bug.”*

— Jonathan DeKock / Senior Architect, Cadence

Cadence turned to Out-and-About\* and set up a 20 machines server farm on the customer site, running multiple instances under recording 24x7 until the bug next struck.

*“As soon as the code failed we got experts on the line and they were able to use the recording generated by Out-and-About\* to step backwards and forwards line by line using UndoDB. We found the bug in three hours, and it then took just two hours to solve, which was a huge win after three months of searching using other methods. Given its nature we simply couldn’t have found it through source code analysers, as it was generated within dynamic code.”*

— Jonathan DeKock / Senior Architect, Cadence

Solving this customer problem proved the value of Undo’s products to Cadence and has led to an expansion of its use within other Cadence groups. In-house engineers at any of AVS’s four sites can now use it, through a group-wide licence.

*“The problem with traditional debugging is that you can see the failure but not why it happens. With Undo we’re able to debug the impossible problems and see what caused them. It is now one of our most important tools for these customer-critical situations – using it for these problems has delivered real value and we can also see the productivity gains it provides for day-to-day debugging.”*

— Andy Eliopoulos / Vice President, Advanced Verification Solutions, System & Verification Group.

# Undo™

---

9 Signet Court - Swann's Road  
Cambridge, UK CB5 8LA  
<http://undo.io>

 [linkedin.com/undoltd](https://www.linkedin.com/company/undoltd)

 [twitter.com/undosoft](https://twitter.com/undosoft)

\*Out-and-About is now part of Live Recorder for Production