

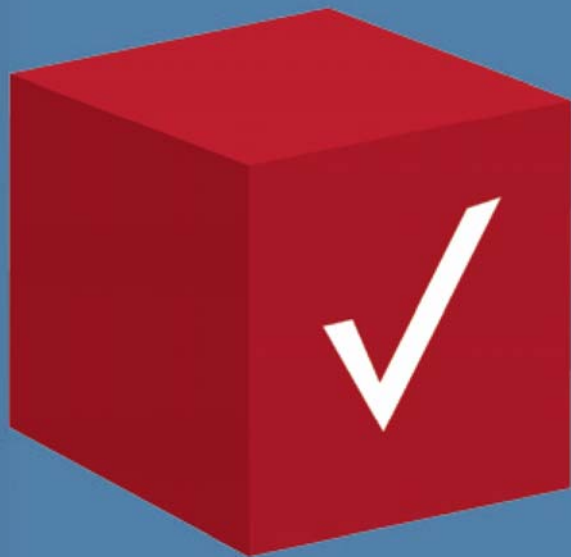
WIND RIVER

Don't Crash at the Finish Line

Overcome Skyrocketing Device Complexity to Deliver Products on Time and on Quality

Paul Henderson

Vice President of Product Marketing, Device Test, Wind River



Executives Off Balance and Anxious

Executive Summary

Across the embedded industry, product development executives are facing growing challenges with device software quality. Exponential increases in software content and device complexity are outpacing the capabilities of existing testing methods. More product teams are experiencing late-cycle quality surprises that cause them to “crash at the finish line” with major schedule delays or defective product deliveries.

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Without better insight into true device software quality, product development executives can make ill-informed decisions that can put their companies—and their careers—at risk. Product leaders are becoming increasingly uneasy with this situation and are looking for a game changer. Now they have an answer. Device software market leader, Wind River, has developed a new type of device testing solution that provides

unprecedented run-time visibility into the operation and quality of complex devices under test. The new Wind River Test Management system delivers actionable intelligence that lets teams focus their efforts on what really needs testing, helping development leaders optimize and automate their activities to deliver quality products on time, every time.

New Challenges and Anxiety

Product development executives in the embedded device industry know their jobs are a balancing act. Juggling features, quality, resources, and costs against time-to-market, you know there is no perfect solution. This is especially true when it comes to quality. There will always be bugs, but you must ensure that the critical defects are eliminated before delivery. Today, however, industry trends are making it increasingly difficult to be ready to ship products on time and on quality.

Several major trends are reshaping the embedded device industry, creating new challenges and anxiety for product development executives:

- **Skyrocketing software content:** Today devices rely on software-based functions more than ever before. According to industry analysts, software content in intelligent devices is doubling every two years. In many industries, devices are no longer fixed-function but are increasingly based on software

platforms that are updated with new features from the manufacturer or third parties many times during the life of the device.

- **Accelerating architectural complexity:**

Many products are now racing past 16- and 32-bit processors into 64-bit architectures that leverage multiprocessors and soon multicore technologies. These systems are pushing the envelope with higher performance and capacity, or cost- and power-reducing higher density. Many are using multiple operating systems within a single product, and now hypervisor-based virtualization technology is being leveraged to deliver advanced user interfaces, accelerated network communications, and dramatically higher throughput.

- **Compressed time-to-market:** Across every industry, the global business environment has grown hyper-competitive, with companies striving for first-mover advantage. Despite the double or triple software content and complexity, development and test teams have to deliver high-quality products in the same or even less time.

Against this backdrop, product executives are realizing they “can’t get there from here” with current approaches. They are finding it increasingly difficult to deliver validated products on time.

Perceived vs. Actual Quality

Across the industry, critical projects that appear to be on track suddenly fail to deliver on time or on quality due to late-cycle surprise software problems. There are many examples:

- A commercial aircraft manufacturer was forced to delay the introduction of a new

100-seat commuter jet due to the discovery of a critical software problem. A company executive said, “As everybody knows, software takes a bit of time to retest.”

- A leading medical device manufacturer had to conduct a worldwide recall of one of its heart defibrillators after software in the units failed to detect defective batteries and some of the malfunctioning units were involved in patient deaths.
- Customers of a major network equipment maker experienced critical outages after last-minute feature additions to a new software release were missed by the device testing team. The downtime damaged the company’s reputation and resulted in costly service level agreement charges.
- A top smartphone provider had sales of its latest product suspended by retailers after customers reported a software problem with its touch screen, impacting the company’s key holiday season sales.

Executives at these companies clearly thought they were on target for delivery; instead they learned difficult lessons about their lack of visibility into the true quality of the software components embedded in their products. Dozens of similar episodes made news around the world in 2009 and there were surely many others that were kept quiet.

The common thread that runs through these delivery missteps is the disconnect between the perceived and the actual quality of the embedded software. Operating with wholly inaccurate information, these executives made unfortunate decisions about the market readiness of their products.

Changing the Game with Actionable Intelligence from Devices

So what's going on here? The underlying problem leading to these failures is that we have reached an industry inflection point caused by skyrocketing device complexity.

Responding to this, many organizations are moving to iterative or "agile" development methods, with a goal to provide better feedback early and often about how well they are meeting functional and quality goals. But the complexity of testing devices in this fast-changing environment is a barrier to success. It is usually impossible to test every permutation and execution path within the time allotted. The real feedback teams need is often inaccessible, trapped within the devices under test. Managers are finding they cannot fully reap the benefits of their iterative processes. The bottom line is traditional testing methods and tools alone are no longer adequate for today's complex devices.

Managers know that their teams can't simply work harder; they must find a way to work smarter. It's time for a game changer. You need an effective way to continuously measure where you really are with quality using information from the device itself. You need a way to use this information to optimize and focus your testing efforts so you can test more thoroughly in the time you've got and make better business decisions as you go to market with critical new products.

Eliminate the Guesswork

You know that whatever good you accomplish in developer "unit" testing, the real validation work is done when you integrate your device hardware and software and start testing the fully functional

system. This is where your critical design, coding, or timing defects will surface.

Unfortunately this "black box" integration testing phase is where you are most blind to what is really going on in the device. You are working with production software (not special test builds) and your team's debuggers and other development tools are too intrusive for use. Your development team may be releasing a new build every week—or perhaps every night. You want continuous feedback as to how you are progressing.

But today you are left guessing at where you really are in regard to quality:

- How thorough is my test suite? Do I understand where the gaps are?
- How much of my software really has been tested?
- What is new in this week's build? What code has changed?
- Have I validated the hard-to-test failure and error conditions?
- Have I found the performance bottlenecks?
- Is my team focused on the areas that will make a difference?
- How long will it take to isolate this new defect?
- Are my key quality metrics trending positively?
- How can I automate more of my process?

You want to optimize your precious resources and be as informed as possible as you make your release readiness decision. But you are uneasy because you know that your current methods and tools are no longer up to the job. That leaves you and your company exposed.

Work Smarter with a New Kind of Software Testing 'Appliance'

What you need is a new approach to deriving business intelligence from embedded devices under test. You need to move from “black box” to “white box” device testing that lets you gather precise, actionable information about quality status from your products and conduct more effective testing in less time.

Wind River has developed a revolutionary solution to address this very problem. Wind River Test Management is a new type of device test optimization system that helps you focus on what really needs testing. The system leverages unique, dynamic instrumentation technology to let your developers and testers probe directly into your device at run-time (including multicore systems) to capture critical quality and operational information. It lets you identify holes, isolate defects, and respond to change. It provides automation that helps you rapidly exploit this intelligence to optimize your processes and resources so you can deliver on time and on quality and with greater confidence.

Wind River Test Management allows testers to work with production software, not special test builds, and gather the information they need to work smarter. The system adds value to your existing test tools—rather than replacing them—to provide the visibility and control you need to more thoroughly test your complex embedded systems in optimal time.

Now you can do the following:

- Find untested software so you can close the holes in your test suites.
- Identify changed code and automatically determine required regression tests.
- Measure performance and find run-time bottlenecks.
- Automate testing of critical fault handlers and edge conditions.
- Rapidly isolate and repair run-time defects across distributed teams.

Stop flying blind. Move from “black box” to “white box” testing to leverage actionable quality information captured directly from your products.

Designed for the demands of modern iterative development processes, Wind River Test Management enables more productive collaboration across distributed development and test teams. Its open test execution environment allows your teams to optimally run just the right manual or automated tests from any source and manage lab devices with ease. Its full life cycle test information database, comprehensive dashboards, and custom reports provide the consolidated information

you need to optimize your processes and resources and drive better business outcomes. Wind River Test Management ensures that you will be better positioned to achieve your business objectives by achieving your quality goals, on time, on budget, and with confidence.

Focus your time and resources on what really needs testing, so you can deliver higher-quality products on time with greater confidence.

It's Time to Take Action

Don't crash at the finish line of your next development program because of a device software quality problem. There's a gap in your current test environment and it's preventing you from getting the information you need to make

the best decisions about product readiness. You can bridge that gap, and ultimately close it completely, with Wind River Test Management. For a small investment, our solution can make a big difference in your outcomes.

Why put up with product quality blind spots for one more day? Take the first step toward higher productivity and confidence. Talk with our team of device software experts at Wind River. Sponsor a discovery project with your team and we'll come in and take a close look at your test operations and make specific recommendations for how we can help. We have more than 30 years of experience in ensuring the success of many of the world's largest product companies—and we'll do the same for you and your organization.

For more information on Wind River device testing solutions, visit www.windriver.com/product/test_management/, or contact us: www.windriver.com/company/contact/.

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Wind River is the global leader in Device Software Optimization (DSO). We enable companies to develop, run, and manage device software faster, better, at lower cost, and more reliably. www.windriver.com

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