

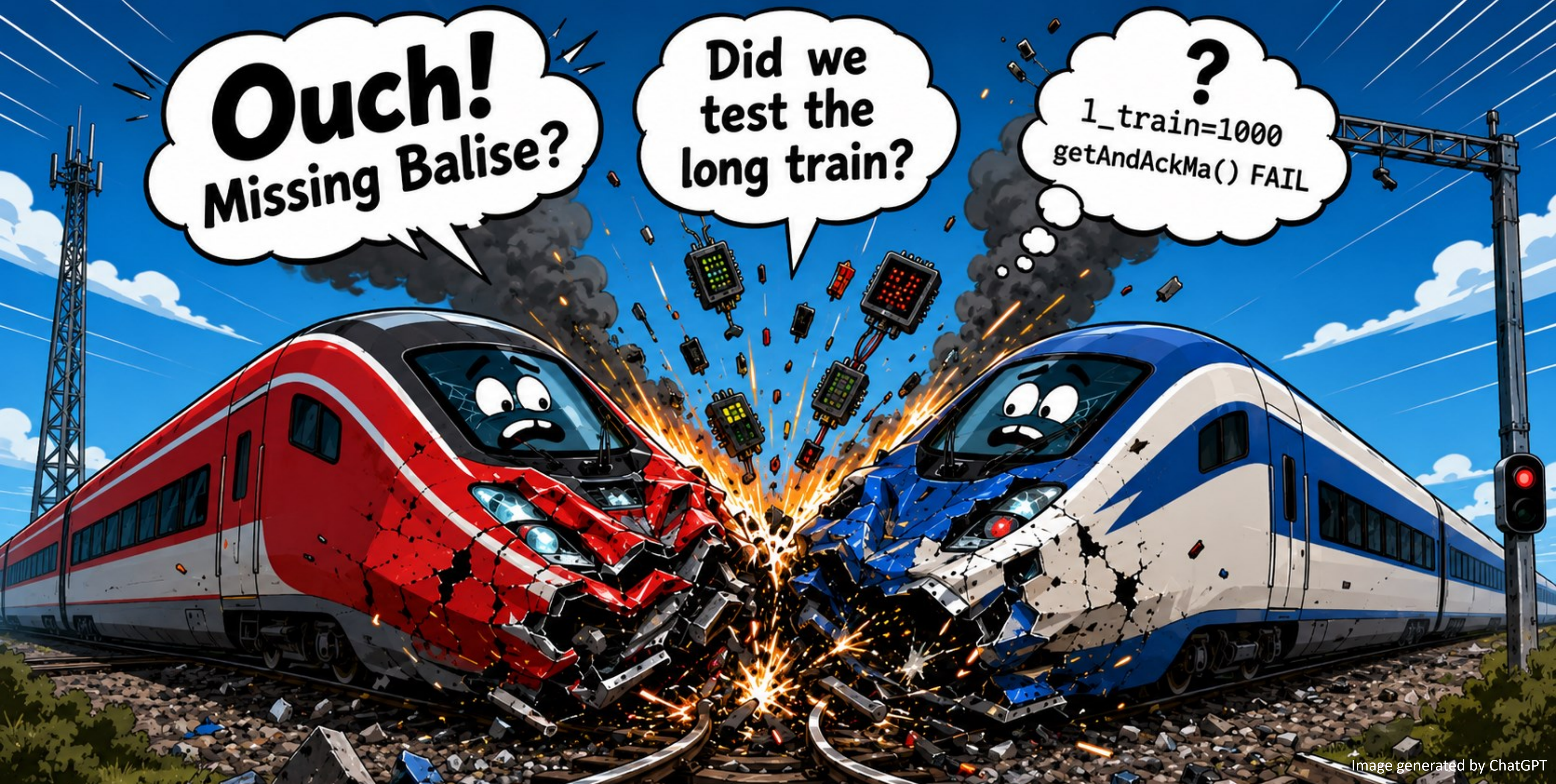


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Can automated testing find every hidden risk in railway signalling?

What do I need to know?

ERTMS is Europe's shared railway signalling system. Alstom builds trains and technology used around the world. One part of ERTMS is the Radio Block Centre, or RBC, which talks to trains by radio and tells them how far they may safely move.

How was it investigated?

An existing automated test setup for Alstom's Radio Block Centre was investigated. Train lengths were changed, route-based tests were generated from site data, and scripts were written that searched existing tests for documented minimum and maximum values.

What did the data show?

Changing train length exposed hidden test assumptions. A baseline run passed all 2738 tests, but changed lengths produced failures. The route generator ran 530 generated tests, with 426 passing. The boundary check found that 29 of 43 analysed parameters had neither minimum nor maximum value detected.

So, what's the problem?

Railway signalling software helps decide when a train may move and how far it may go. That makes testing really important. The challenge is that a test suite can look strong when every test passes, while still hiding fixed assumptions about train length, route layout, or unusual parameter values.

What is the new setup?

The new setup turns three manual questions into repeatable checks. What happens if train length changes? Can one template create many route tests? Are important limit values actually present in the test files? The aim is to find errors at the subsystem testing level instead of system tests, as finding them earlier is cheaper.

What is the main takeaway?

Passing tests are not always the full story. Variation, generation, and boundary checks can reveal weak spots that are hard to see by hand. The results do not prove faults in the railway software, instead they show where the tests can be improved.

Dynamic test script generation for test and verification in continuous integration
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