

CERN selected BUGSENG's ECLAIR to check ROOT's Coding Conventions

Automated Coding Conventions Checks makes for Clean Code

Geneva, September 25th, 2013. CERN, the European Organization for Nuclear Research, one of the world's largest and most respected centres for scientific research, announced today that it has acquired a license of the **ECLAIR software verification platform** instantiated to automatically check the ROOT project coding conventions. **ROOT is an object-oriented program and library** for High Energy and Nuclear Physics (HENP) used in several particle physics experiments including those based on the Large Hadron Collider (LHC), **the world's largest and highest-energy particle accelerator**, for which it routinely analyzes and visualizes data amounts of the order of petabytes.

“While the international core development team of ROOT is rather small, the project has seen, over the years, hundreds of contributors worldwide,” says Fons Rademakers of CERN, ROOT project leader.

“This, together with the **criticality** and the intended lifespan of the project, calls for adherence to a well-defined set of **coding conventions**. Since more than two years we automatically check these conventions using an incarnation of the ECLAIR platform especially crafted for us by BUGSENG: we **never had the slightest problem**. Every night ECLAIR is **automatically run** over the ROOT code and the results are made available via the web to all developers worldwide.”

Software quality is a big issue in today's software market and BUGSENG's advanced tools and expertise help development teams to automatically verify their work along several different axes.

“**ECLAIR's flexibility makes it possible to provide very accurate and configurable automatic checkers for any coding convention**, no matter what.” says Roberto Bagnara, CEO of BUGSENG.

“The collaboration with CERN gave us the opportunity to extend ECLAIR with computational linguistics tools that help keep the program vocabulary, used both for the identifiers and in the comments, under automated control.”

About CERN

CERN, the European Organization for Nuclear Research, is an intergovernmental organization with 20 Member States. Its seat is in Geneva but its premises are located on both sides of the French-Swiss border. CERN's mission is to enable international collaboration in the field of high-energy particle physics research and to this end it designs, builds and operates particle accelerators and the associated experimental areas. At present more than 11,000 scientific users from research institutes all over the world are using CERN's installations for their experiments.

CERN's physicists and engineers are probing the fundamental structure of the universe. They use the world's largest and most complex scientific instruments to study the basic constituents of matter – the fundamental particles. The particles are made to collide together at close to the speed of light. The process gives the physicists clues about how the particles interact, and provides insights into the fundamental laws of nature. CERN's research at the frontiers of science also pushes back the boundaries of technology and the results, in areas from

computing to materials science, can have much broader applications.

More information on CERN is available at www.cern.ch

About ROOT

ROOT is an official project within the Physics Department at CERN, providing a basic framework that offers a common set of features and tools for all domains of HENP computing.

Since its inception about two decades ago, ROOT has been extended in many directions to become the cornerstone of most HENP software systems, covering many areas of HENP computing, like analysis, simulation, reconstruction, event display and DAQ. Since ROOT is an open system that can be dynamically extended by linking external libraries, ROOT forms a premier platform on which to build data acquisition, simulation and data analysis systems. ROOT is now being used in many other fields, like astronomy and biology as well as in finance, medicine and data-mining.

The planned evolution for ROOT involves the efficient use of parallel and heterogeneous computing architectures to tackle the even more formidable challenges in terms of data complexity and size posed by the LHC upgrade program and the new experiments being designed at CERN and elsewhere.

More information about ROOT is available at root.cern.ch

About BUGSENG

BUGSENG srl (Parma, Italy), a spin-off of the University of Parma, is a new and dynamic company with a long tradition in automated software verification. The founders, who work in the field since more than 15 years, made important contributions to the theory and practice of program verification.

ECLAIR is a powerful, flexible and extensible platform for the analysis of C, C++ and Java) source-code. It supports both syntactic analyses and semantic analyses based on the latest developments of abstract interpretation, model-checking and constraint-based reasoning. Applications include: validation of coding rules (either user-defined or taken from popular coding standards: MISRA, CERT, NASA/JPL, ESA/BSCC, JSF, High-Integrity, Netrino, ...); automatic test-case generation for coverage and triggering of run-time anomalies or proof of their absence; semantic matching and patching.

More information on BUGSENG and its products and services is available at bugseng.com

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