

Case Study: Iskratele Slovenia



SI2000 Media Server provides VoiceXML driven voice services to TDM or IP end users.

Iskratele is one of the world's leading providers of state-of-the-art communications solutions, with more than 50 years experience in the development of complete solutions for fixed and mobile telephony, convergence networks, next-generation networks and network management. Based in Kranj, Slovenia, Iskratele is a joint venture between Siemens AG and Slovenian investors. The company's primary market presence is in Eastern and Western Europe, with development and production also in Russia and the Ukraine.

Iskratele's core product line includes classes 4 and 5 Switches, Soft Switches, Broadband Access, Digital Subscriber Line Access Modules (DSLAM) and Voice Gateways. Class 4 and 5 Switches support the SS7, DSS1, V5.2, QSIG and Channel Associated Signaling (CAS) protocols, for up to 500,000 subscribers per system. Their Broadband product range includes support for the ADSL, ADSL2+ and VDSL protocols. With a workforce of over 1,100 people, Iskratele are recognized as the clear market leaders in the WireLAN market.

To support such advanced technologies, Iskratele relies on applying the latest, cutting-edge software development techniques, employing over 400 developers split between Iskratele and Siemens at the Kranj site. The majority of source code is written in C, SDL, Java, and some C++, with C being used for algorithm development, and Java powering the interfaces for the management networks. In all, there are between 1 and 1.5 million lines of code for a typical application, including 3rd party software. An average project requires 200 man months, and 80 man years for some of the larger applications.

With such complex software being developed, it became apparent that Iskratele would require advanced testing solutions to find and eliminate software bugs at an early stage in the lifecycle. It was the task of Sani Rus, Development Manager at Iskratele, to find appropriate tools that would assist with **early identification and removal of software bugs** from application code. "As with all software departments, we were struggling with the usual quality issues: writing bug free code that was easy to understand, maintain and extend. We began looking for tools that would help us find defects early; not just source code defects, but also architectural problems, buffer overflows and security problems", said Mr Rus. "There was a desire in the department to increase the quality of the software we were developing, and increase developer's productivity by freeing them from costly code reviews and inspections. We wanted a fully automated solution".

After some research, Mr Rus identified and selected three products for closer examination, Klocwork K7 being one of them. His aim was to assess all three products and select one on the basis of technical performance, ease of use and demonstrable return on investment. A key requirement was also **seamless integration** into Iskratele's VxWorks/Tornado and CGE Linux makefile-based development environment. Further, multi-platform support for the tool was essential, as the projects use both Windows and Red Hat Linux development machines.

During the second half of 2005 and early 2006, Iskratel invited three leading companies in static source code analysis to their offices in Kranj. "We decided to put all products through their paces using one of our applications as a benchmark", Sani explained. "We ran their tools over an application of around 40,000 lines of code."

Sani states: "All of the tools found some bugs, **but we were astonished with the speed of analysis of the Klocwork tool**, and the diversity of bugs found by Klocwork K7. Klocwork's analysis phase took about the same amount of time as the GNU compiler we use. After a detailed analysis of the results, we concluded that Klocwork found an order of magnitude more relevant bugs than the other tools. It also had a superior user interface, and was a more fully featured tool than the others. We thus made a positive decision for Klocwork".

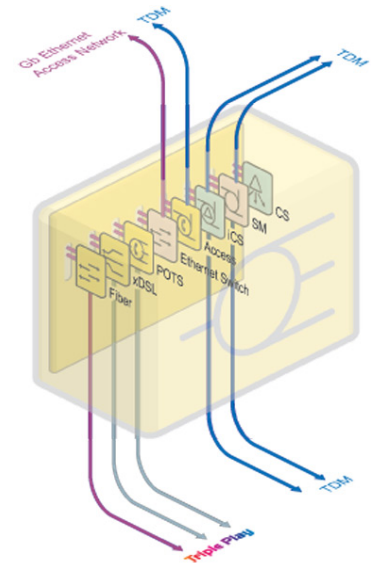
One issue in particular impressed the software development team at Iskratel. The team had been struggling with a bug in the application that led to an infinite loop occurring under random, special conditions. Several man-weeks of development effort had already been allocated in order to track the problem down. Klocwork found the buffer overflow problem immediately. Mr Rus remarks: "If I took all resources allocated to find this bug, it would be run into several weeks. 3 or 4 developers and designers were in the labs, hunting for the bug, and of course, while that happens, there are project delays and everything stops. This bug was on the critical path, and the whole verification phase was being held up". We ran Klocwork and in much less time, we found the same bug. We were deeply impressed with Klocwork's ability to find such difficult bugs in a short space of time."

Dejan Potocnik, senior developer at Iskratel on the Soft Switch project, agrees: "Klocwork Inspect is a very useful tool, finding some critical bugs such as **buffer overflows, array boundary violations, memory leaks, suspicious semicolons and dead code**. Klocwork Insight is also extremely useful, providing an easy-to-use graphical view of the architecture and relationships between components and entities."

So what about the future? Sani concludes: "Using Klocwork has definitely improved the quality of the software we develop, increased the productivity of the software developers and reduced the number of bugs in our applications. We are more than happy with Klocwork K7, and we have plans to extend the use of Klocwork for future software projects at Iskratel".

IPL and Klocwork would like to thank Iskratel for their participation in this case study. We wish them well for this project, and for all future projects.

The text for all IPL product case studies is agreed and approved by our customers.



Iskratel's SI2000 MSAN Multi-Service Access Node

FURTHER INFORMATION

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