Coverity Case Study

ip.access

ip.access improves product quality across its software supply chain and accelerates development lifecycle by 15 percent with Coverity

Business Benefits

Better quality products
Meet customer SLAs for 99.999% availability to avoid financial penalties, with zero field crashes since implementing Coverity.

Suppliers accountable to consistent standards
Mandate and enforce consistent code quality and security standards across internal teams and third party suppliers, ensuring critical defects are resolved prior to release regardless of where the code was developed.

Accelerated development lifecycle by 15 percent
Defects in code can be quickly identified and resolved, which keeps development activities and product launches on schedule.

Business Overview and Challenge

Headquartered in Cambridge in the UK, ip.access makes market-leading small cellular base stations to help mobile operators solve coverage and capacity problems for business and consumer users.

ip.access and its 385 employees are at the forefront of new developments in mobile communications technology. The company's femtocell and picocell solutions act as radio transmitters and receivers, providing a signal for mobile phones inside buildings. They work over much shorter distances than traditional base stations and can be connected to the mobile operator's network via the Internet rather than a dedicated transmission line. Jason Cooper, Engineering Team Lead at ip.access, comments, "Mobile coverage in homes, offices and public places can be disrupted by walls or other solid objects. Our solutions help increase data throughput on 2G and 3G mobile networks so users can communicate or stream multi-media content more effectively."

ip.access' femtocells and picocells can be found in over 60 mobile networks around the world. The solutions - which are also used by system integrators and OEMs (original equipment manufacturers) - help mobile operators increase revenues from voice and data, differentiate their services and safeguard customer loyalty. To ensure these products meet customer quality expectations, ip.access needs to be able to measure code quality early in the application development lifecycle – and in a short timeframe. A consistent level of code quality is essential if ip.access is to meet the stringent service level agreements imposed by its customers, which, if breached, can result in financial penalties. "As soon as there's a software crash on one of our products, we potentially start losing money," adds Cooper.

To deliver new features and functionality, ip.access is increasingly reliant on a supply chain of internal teams, offshore teams, and outsourced development partners. "With outsourcing, you immediately encounter challenges around consistent results, communication and turnaround," comments Cooper. "Our products need to offer 99.999% availability, which means we have to be confident that the code being provided by external developers is defect-free."

As part of the agreement with its outsourcing partner, ip.access has just 30 days to formally accept source code that has been submitted. After that time, the provider is no longer obliged to fix any defects. In particular, ip.access needs to eliminate any issues that fall in six critical areas which could lead to product performance degradation or downtime, including uninitialised variables, array deletions and resource and memory leaks.

"We use Coverity to help ensure that the software that operates our market-leading solutions for GSM, GPRS, EDGE and 3G is not compromised by a software problem that could impact our carrier-grade reliability."

Jason Cooper
Engineering Team Lead at ip.access

As well as checking an average of 50,000 lines of code submitted by its outsourcing partner each month, ip.access also needs to verify the work of its own offshore development team and other third party suppliers. This supplier base includes companies providing firmware, software and open source components, which are used in ip.access products.

"Business users and consumers demand a high level of reliability and availability from mobile operators, which means we must ensure there are no defects in our products that might impact performance," comments Cooper. "With multiple suppliers contributing to our femtocell and picocell solutions, this uncompromising approach to defects has to apply to every line of code – whether it is written by an ip.access developer, an outsourced partner or a third party software vendor. Manual unit tests and peer review had become too time-consuming and increased the time to market for our products. We needed a faster and more effective way to get all code to the same level of quality and measure the performance of our suppliers."

To safeguard the integrity of software across its software supply chain, ip.access decided to establish a continuous integration development process founded on development testing via static analysis.

Solution Evaluation

Prior to deployment, ip.access conducted two formal evaluations of Coverity® Static Analysis; the solution not only found complex defects but also returned a lower false positive rate than other vendor offerings.

"The evaluation pinpointed defects with the code used in existing products, which the average developer or methodical tool would not be able to find," comments Cooper.

The assessments also revealed a key differentiator. As Cooper explains: "Deploying a tool that finds software defects is only part of the equation; it's also important to help developers deliver a fix. Coverity doesn't just deliver a bunch of reports, it provides developers with pre-defined workflows to help them maximise and prioritise their time so they can easily eliminate software defects."

Coverity Deployment and Benefits Realized

Three years since its deployment, Coverity Static Analysis is fundamental to its development testing strategy across ip.access' software supply chain.

The solution is used to evaluate code from a number of sources including:

- The company's outsourcing development partner
- In-house ip.access developers based offshore
- Multiple software vendors supplying code and components
- Open source software providers

With a false positive rate of less than five percent, Coverity results are relevant, accurate and actionable.

An average of four million lines of code is submitted for analysis on a nightly basis and the results are then reviewed based on their criticality. This is defined using the solution's built-in defect management workflows, which categorize defects into three groups.

"We use the three defect categorization levels as a way to provide teams with achievable targets," comments Jason. "Once we have addressed the defects in the six critical areas, we then move on to the secondary level. Once the code is 'Coverity clean' across all three categories we then fix any further defects as they arise."

Although Coverity Static Analysis comes with pre-built checkers, ip.access has programmed the solution with more than 200 custom constructs including checks for complex data structures.

To prevent future products being released with potential defects - which could impact both customer satisfaction and profitability - ip.access now mandates its suppliers to provide Coverity clean software and source code as part of their contracts and uses this as a performance measurement. As a result, ip.access has been able to help a middleware supplier and protocol stacks outsourcing partner resolve defects in their products before embedding them in the ip.access femtocell and picocell solutions.

For ip.access, a consistent quality standard across its software supply chain translates to more reliable products and less downtime for its customers and their mobile subscribers. "We use Coverity to help ensure that the software that operates our market-leading solutions for GSM, GPRS, EDGE and 3G is not compromised by a software problem that could impact our carrier-grade reliability," said Cooper.

Since implementing Coverity Static Analysis, ip.access has experienced zero software failures. As a result, ip.access can achieve the SLAs set by the mobile operators and avoid financial penalties. This safeguards the company's reputation and revenue stream from its new 3G products.

"Now all code used in our products is Coverity clean with zero defects, which ensures a consistent standard of quality across the software ecosystem," said Cooper.

ip.access has not only been able to enhance competitive advantage through its reliable products, but it has also reduced time-to-market for new customer offerings. "We can identify hard to spot defects in a shorter timeframe, which enables us to meet the 30-day acceptance window for our outsourcer's code," comments Cooper. "Within 24 hours of a developer writing some code, they receive the results of the Coverity analysis. This saves valuable time during system testing, which prevents delays to our product launch schedules."

Conclusion

Software integrity is paramount to the overall quality and reliability of ip.access products. Using Coverity Static Analysis as its development testing solution of choice, ip.access can easily and cost-effectively detect - and fix – defects in code developed across its geographically distributed teams and third party suppliers. As a result, ip.access can eliminate problems that might cause outages for its customers before products are released on the market. This contributes to the company's competitive advantage and profitability.

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