

2009 World Security Test Equipment
Technology Leadership of the Year Award

Codenomicon Ltd.

Codenomicon is headquartered in Oulu, Finland with offices in Hong Kong and the Silicon Valley. The company is a spin-off from the PROTOS test tools research division of the Oulu University's Secure Programming Group. Since its foundation in 2001, Codenomicon has been active in the area of security testing and has helped several companies, including Microsoft, Nokia, AT&T and Cisco, in testing their products and services for undesired behaviour, security and robustness. The test solutions provided by Codenomicon are used across a variety of end-user segments, including software applications, private networks, defence, enterprises, research labs and mobile communications. In 2001, Codenomicon launched its trademarked testing platform DEFENSICS™, which applies intelligent fuzzing techniques to serve the testing needs of network equipment manufacturers, network operators and enterprises. The company recently launched an updated version of the platform, DEFENSICS 3.0, which can be used across several next generation communication technologies, such as 4G/LTE, Metro Ethernet, FCoE, WiMAX and XML.

One of the challenges faced by software and application developers is identifying flaws in communication interfaces of their solutions. They find it hard to effectively target their testing effort in the face of an infinite number of potential vulnerabilities and to inspect deeper protocols. Codenomicon's DEFENSICS addresses these challenges by employing the patent-pending Attack Simulation Engine and deep protocol models. The company's unique methodology to test products for robustness enables developers to target the vulnerable portions of the protocol with a high degree of accuracy, while maintaining broad coverage through automatic test generation.

Features of DEFENSICS

- Support for a broad range of protocols covering more than 150 different interfaces.
- Pre-built test cases to avoid manual test set up cost.
- Proven test methodology and technique to mitigate unknown vulnerabilities.
- Multiple attack vector defence.
- Quality and security test best practices to manage software development lifecycle in a cost-effective manner.

DEFENSICS for XML Fuzzing

XML is a fast growing technology, which is replacing protocols in communicating information between hosts and users. While working on XML testing, Codenomicon tested multiple XML libraries and found vulnerabilities in the parsing of XML data. It quickly became apparent that the found vulnerabilities could be exploited by injecting malicious requests to web hosts, which handle these XML files. Codenomicon then worked together with CERT-FI (Finnish National Computer Emergency Response Team) to find solutions for fixing XML vulnerabilities.

XML is used basically everywhere, including areas like cloud computing, web applications, instant messaging, mobile networks and office documents. Any changes made to XML files, like dropping tags or repeating tag elements, can result in the execution of a malicious code on the host, thereby causing errors in communication or a denial of service situation.

Some common applications subjected to security threats:

- Banking and finance – stock information systems and intranet systems
- Electronic commerce – web service interfaces (WSI) for money transfers
- Telecom and Internet - web applications, social networking websites
- Public infrastructure – remote meter reading for gas, energy and water
- Healthcare – Patient data system integration

With Codenomicon's solutions, the security of several XML applications, including VoIP, SOAP, web applications and industrial automation, can now be tested.

DEFENSICS for LTE Fuzzing

All new technologies are infested with reliability issues, and 4G technologies such as LTE, IMS and WiMAX are no different. This is due to increased complexity, fast release cycles and new technology, which has not been tested thoroughly. DEFENSICS has been used to find and fix numerous critical robustness issues, including critical interoperability flaws in telecommunications software. Codenomicon DEFENSICS testing solutions now also cover emerging 4G technologies, such as LTE, helping customer to harden their systems before deployment. LTE is the technology of choice for 4G telecommunications. It enables All-IP applications in mobile devices using standard Internet protocols for communications.

DEFENSICS for LTE provides unique value by supporting core LTE protocols, such as GTP and Diameter. It assures the security and robustness of underlying protocol layers like IP, including Mobile IP, and also supports UDP and SCTP. For an all-IP LTE network, Layer 3 tests covering end-to-end connectivity are important: Network entry, authentication, call setup and security procedures have to be exhaustively tested. The significance of Layer 3 is underlined by the fact that it is the LTE entry vector, which is visible to the largest amount of consumers. As such, non-compliant client devices and malicious hacking attempts are likely to be encountered. DEFENSICS for LTE protocol summary:

- * GTP
- * Diameter
- * IPv4
- * IPv6
- * UDP
- * SCTP

The most important use scenarios to be tested involve User Access (UA) to LTE/EPC core and an interface between LTE/EPC and open Internet (PDN-GW testing to be more precise). In testing User Access, the Serving Gateway (SG) and the Mobility Management Entity (MME) are the most critical components to be tested. These

components also play a major role in roaming scenarios between operators, creating a trust boundary requiring a high level of robustness. An aspect, which the operator can least control in an all-IP network, is IP traffic originating from user equipment, and as such, the robustness of IP packet handling should be thoroughly tested in an end-to-end configuration. Packet Data Network Gateways (PDN-GW), together with the AAA servers create the outer boundary of LTE/EPC facing the Internet. PDN-GW is also part of the trust boundary in roaming scenarios. This requires a high degree of robustness and reliability from the components.

Conclusion

Codonomicon is a market leader in the product security test market with its proactive test solutions for new technologies. XML is one of the key enablers of Cloud computing and Web 2.0, two new complex domains in need of new testing. LTE, on the other hand, is expected to boost the demand for wireless test equipment as soon as deployment starts in 2010. Also, with the increasing popularity of mobile applications and social media networks, the importance of testing these services for security has greatly increased. Codonomicon has already released a DEFENSICS version for 4G networks. Codonomicon will also release general purpose traffic capture fuzzers by end of 2009, providing support to proprietary protocols, where model based tests are not available. As Codonomicon continues to expand its solutions across various platforms and technologies, it is likely that the company will continue to be the leader in protocol fuzzing technology in the future. Codonomicon has helped several clients identify flaws in their solutions, in addition to, spending time and resources fixing open-source libraries using their DEFENSICS fuzzers. All these factors make Codonomicon worthy of receiving the Frost & Sullivan '2009 World Security Test Equipment Technology Leadership of the Year Award'.

Award Description

The Frost & Sullivan Technology Leadership of the Year Award is bestowed each year upon the company that has demonstrated excellence in technology leadership within their industry. The recipient company has demonstrated technology leadership by excelling in all stages of the technology life cycle—incubation, adaptation, take-up,

and maturity—to ensure a continuous flow of improvements. By innovating leading-edge concepts, the company has pioneered client applications.

Research Methodology

To choose the recipient of this Award, the analyst team tracks all emerging technologies and ongoing research and development projects within the industry. This process includes interviews with all the market participants and extensive secondary and technology research. The technologies and research projects are then compared according to customer base demands. Also considered are elements such as feasibility of product launch, likelihood of customer acceptance and acceptance rates, and estimated time to market. Competitors are then compared and ranked for relative position. The company chosen to receive the Award received the number one industry ranking.

Measurement Criteria

In addition to the methodology described above, there are specific criteria used in determining the final ranking of competitors in this industry. The recipient of this Award has excelled based on one or more of the following criteria:

- Significance of the technology in the industry
- Number of competitors having similar industry technology (competitive factor)
- The technology refinement process meets changing end-user needs (addresses research and development efforts by vendors)
- Value-added technology and services to the customers
- Adoption rate by each of the industry participants (denotes responsiveness of the vendors)
- New product innovation

About Best Practices

Frost & Sullivan Best Practices Awards recognize companies in a variety of regional and global markets for demonstrating outstanding achievement and superior performance in areas such as leadership, technological innovation, customer service, and strategic product development. Industry analysts compare market participants and measure performance through in-depth interviews, analysis, and extensive secondary research in order to identify best practices in the industry.

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