



*ReliaMetrics Enterprise (code-named EMERALD)*

Technology Infrastructure:

Infrastructure Management

➤ Risk Assessment and Quality Management for Software Reliability

**BUSINESS BENEFIT**

In e-business, outages and service interruptions are immediately visible to the world and can haunt your company's reputation for years. As engineers enhance established systems, they may inadvertently introduce new errors. The ReliaMetrics risk assessment methodology scientifically identifies the software components that are likely to fail when changed, indicating where developers and testers should focus defect prevention efforts. With Nortel's assistance in refining and automating a quality process for software development, teams work faster, more accurately, and with less stress.

**TECHNOLOGY HIGHLIGHTS**

Today's online financial service providers and other large e-businesses depend on large, complex software bases. The consequences of failure can be catastrophic, yet extensive testing time is a luxury companies find hard to afford. Software development managers must find a way to achieve both goals--higher reliability and shorter time to market--simultaneously. Nortel provides a powerful system for software development teams to work smarter on the time-to-quality problem. ReliaMetrics Enterprise's patent-pending software risk assessments and predictions accurately identify the software areas that are the most likely to have operational defects in the field. Reliametrics relates data collected from the source code and development environment to operational defect history. It maintains a data warehouse automatically interfaced with configuration management and produces management reports. Nortel consultants tailor models for each organization and software product, and assisting management in establishing best practices for using ReliaMetrics. The first commercial release shipped November 1999.

**CUSTOMER COMMENTS**

- Originally developed for internal use at Nortel, ReliaMetrics Enterprise has won a following in the communications and aerospace industries, and in the military. Customers are applying ReliaMetrics to applications for which a 99.999% or better uptime is required, and where consequences of failure are truly catastrophic. Because of the huge financial stakes involved, time to market and accurate scheduling are extremely important to ReliaMetrics customers.
- Nortel itself uses ReliaMetrics Enterprise to ensure the reliability of switching software. This code base is large, complex, and has been in service since the 1970s. In adding new features and enhancements to the system, and in fixing customer issues, Nortel must avoid introducing new bugs or activating latent defects. With ReliaMetrics, the 1,200-person Nortel team has been able to stay below the industry's threshold of 0.5% defect rate on software fixes introduced within the last six months.
- Another customer relies on ReliaMetrics to develop command-and-control systems for space equipment in Ada and C++. ReliaMetrics has helped developers reduce defect density in finished code in two respects. First, it helps the team reuse code intelligently, adopting cleanly architected modules (and avoiding fragile spots or spaghetti code). Second, it identifies problem areas during new development. Better quality code produced with ReliaMetrics shaves time and costs in the testing process. The tool's output is also helpful in mentoring new staff members, enabling them to come up to speed sooner.
- Interdependence between hardware and software design is a continuing challenge for another Nortel customer. The software is dependent on the final configuration of the aircraft hardware, which is often changed late in the game by customer request. ReliaMetrics Enterprise has helped this prime contractor and its subs identify and focus on the worst problems. They improved adherence to the schedule in a very challenging situation. Having already achieved the Software Engineering Institute (SEI) Level 3 rating, they see ReliaMetrics as a key tool in achieving SEI Levels 4 and 5. Higher SEI-Level ratings may determine ability to participate in certain contracts, particularly in the defense area.
- ReliaMetrics Enterprise consistently wins rave reviews from customers for its ability to defuse tense situations. ReliaMetrics improves teamwork because it enables everyone to discuss facts without subjectivity and emotion. ReliaMetrics provides a way for



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developers to explain to management why some modules take so long to modify, and to justify which components to reuse and which to rewrite. Prime contractors can evaluate subcontractors' code in a way that results in a mutual understanding of costs and schedules relative to requirements changes. ReliaMetrics provides managers a means to explain to sales/contracts personnel which modifications can and cannot be made in a given window of time.

- Managers confirm the utility of ReliaMetrics Enterprise in staff allocation and development. The more experienced members of the team can focus on the most complicated code, while the newer members can tackle the cleaner areas. Developers may initially greet ReliaMetrics with suspicion. Customers say it is important to allow a senior team to validate the accuracy of the tool and begin to spread the word. Unlike many top-down initiatives, ReliaMetrics has grassroots appeal.

- Customers say it is essential to use Nortel's consulting services to set up the metrics and to define the "red zones" in the code. They recommend revisiting the definitions from time to time. For developer and manager convenience, most customers ask Nortel to automate risk assessment and management reporting.

**Deployment Rating:** P. This rating is based on the experience of large software development shops that have implemented beta versions of ReliaMetrics Enterprise (code-named EMERALD) to improve the process for developing and testing complex bodies of code that must perform at 99.999% or better reliability.

ENVIRONMENT

The Model Server resides with the database on a Solaris or HP-UX box. ReliaMetrics Enterprise parses C, C++, and Ada code bases. (Support for Java and Linux is forthcoming in the spring of 2000.) It stores this information in an Oracle-based warehouse

and combines it with metrics extracted from SCM and problem-tracking systems. Data is loaded into the ReliaMetrics warehouse using a data file interface specified by Nortel. Client applications are Java 1.2-based and run on any platform that supports Java 1.2 runtime environment, including Sun Solaris, HP-UX 11, and Windows NT/95/98.

COMPLEMENTS

Supported configuration management systems include Rational's ClearCase and Apex, and Merant's Dimensions. Other complementary applications, including defect-tracking systems, test management systems, and code coverage tools, can be integrated on a custom basis. Data can be extracted from ReliaMetrics Enterprise through the command line interface, through a standard CORBA interface, or directly through Oracle.

COMPANY BACKGROUND

The EMERALD Group is a business unit of Nortel Networks Inc., a publicly held company (NYSE: NT). Nortel's calendar 1999 revenues were approximately \$22.22 billion. The ReliaMetrics Group employs approximately 25 people.

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ABOUT THE CROSSROADS A-LIST AWARDS

The Crossroads A-List identifies the best new enterprise solutions for today's critical business opportunities and challenges. Vendors win a Crossroads A-List Award based on references from early adopters. A Crossroads A-List Award:

- Tells customers when a new product or service has proven its immediate business utility in a critical area of enterprise computing
- Provides a third-party endorsement for complex systems that cannot be duplicated in a lab environment
- Explains the business benefits clearly and concisely

We invite users and vendors to nominate emerging products and services. Winners of the Crossroads A-List Awards are determined after a detailed review of the vendors' product or service and strategies, and three confidential, in-depth interviews with experienced customers. The Awards are presented at the annual Crossroads Conference, which brings Crossroads A-List Award-winning vendors together with business and leading-edge IT executives.

*Deployment Rating System*

Based on reference customer input, OSA assigns a deployment rating to each Crossroads 2000 A-List Award-winning product or service. Interpret the ratings as follows:

- AA Used enterprisewide in Fortune 1000 companies, as well as in the largest Web sites, dot-com companies, and extended enterprises
- A Used enterprisewide in mid-sized organizations (e.g., \$300M to \$2B in revenues), as well as at the department or division level of Fortune 1000 companies, and in significant Web sites, dot-com companies, and extended enterprises
- P Promising new technology for Fortune 1000, mid-sized organizations, dot-com companies, and extended enterprises