Scaling Up to Objects

Matisse Gives Threshold Networks an SQL-Friendly Migration Path to Object-Based Distributed Solutions

When it came time to scale up and out to a distributed model of its IP network management product, Threshold Networks faced an exacting set of requirements, a limited range of options and at least one big risk.

The Requirements

What Threshold had to start with was its EDGE IP appliance, a centralized, automated IP address provisioning and management product that integrates DNS and DHCP services. Combining enterprise-wide control of the IP network with local administration of routine tasks, EDGE IP gives customers greater control and support – plus redundancy and fail-safe resiliency – across their networks and intranets.

But for the next generation of EDGE IP, Threshold wanted to create a true carrier-class distributed network management solution, scalable to the broadband and telecom WANs of multiple service providers (MSOs) as well as the large, complex networks of data center and managed service providers, financial services companies, aviation manufacturers, and other global enterprises.

The Options

The requirements limited Threshold's development options. As a true carrier-class solution, the distributed version of EDGE IP must provision and track tens of thousands of static and dynamic IP addresses, as well as subnets and DHCP ranges – all from a central location, while allowing customers and local administrators necessary read-only access to operational data. It must combine high performance with a small footprint. It must deliver 24x365 reliability without requiring regular local maintenance or management.

In addition, the IP networks to be served by Threshold's distributed EDGE IP solution include not only computers and servers but virtually no end of other devices and appliances, from telephones and set-top boxes to televisions and refrigerators, fax machines, printers, and more.

Threshold's engineers decided that the best approach would be an object-based application. An object architecture would allow them to extend objects easily and take advantage of inheritance. In addition, their message server for communicating among EDGE IP appliances is object-oriented, and ideally they wanted to have one object model shared among the core logic, messaging, and the database – without writing endless conversion functions. An object architecture would provide the extensibility and ease of upgradability EDGE IP would need to serve large and growing networks of mixed devices.

Still, there was another key decision: what kind of database should they use for distributed EDGE IP – object/relational (O/R) or pure object? Most of the "pure" object databases available lack the carrier-class robustness needed. There were O/R databases that could provide that level of service and reliability, but the Threshold engineers didn't want to pay the performance price that goes along with O/R mapping. They wanted a platform that would keep objects and attributes together, passing them among applications and databases with no translation required.

In addition, both the object databases and the platforms with O/R mapping are still dependent on transaction log files for fail-over redundancy; and log files are too bulky, and require too much local maintenance, for the kind of management-free distributed solution the engineers wanted to create.

The Risk

Threshold's smaller-scale products were based on MySQL, an open source relational platform, and Threshold management wanted to leverage the broad SQL expertise of the company's development staff. They also wanted to be able to reuse stored procedures, rather than having to rewrite everything into object syntax or nomenclature. They needed a platform that would allow them to migrate, step by step, toward an all-object solution.

"If we went with a 'pure' object environment, it meant retooling all our resources at once, from programmers to intellectual property," said Dave Hecht, Threshold's software development manager. "We were looking at a long, expensive training and ramp-up period.

"In other words, we would have been starting over, at the risk of delaying shipment of our next-generation EDGE IP solution," added Mr. Hecht. "And that risk was intolerable."

The Solution

Beyond the inadequacies of SQL databases, the performance and log file burdens of O/R mapping, and the daunting development obstacles of an all-object platform, there was a best-of-both-worlds object-SQL solution: Matisse. Matisse gives Threshold the best of both the SQL and object worlds – and a measured, controllable, virtually risk-free migration path from one to the other. And Matisse has proven its carrier-class robustness and reliability in France, where it has been used for years as the platform of choice for nuclear power plant operations management.

With Matisse, Threshold's development team has been able to reuse patterns, codes, and knowledge already in hand, allowing them to focus their object-oriented design efforts where they would yield the most important functionality. For example, Matisse has allowed Threshold engineers to develop a fully extensible object set that will accommodate various device types on large, heterogenous networks.

"The guys developing our object data library love the platform," noted Threshold's Mr. Hecht. "Matisse makes it easy to create, inherit, and maintain objects."

Thanks to Matisse's fusion of native object support and SQL, customers using Threshold's distributed EDGE IP solution will also enjoy the best of both worlds. Matisse's unique versioning engine improves performance while eliminating the need for voluminous, high-maintenance logs. So EDGE IP will run on a small footprint, management-free, yet will provide a consistent view of the database across the network at all times, scaling effortlessly to the IP management requirements of global enterprises. At the same time, customers can continue to use familiar SQL tools like Crystal Reports and ODBC for read-only access of the database.

"With its native SQL support and carrier-class reliability, Matisse is enabling us to get to market faster with a solution that our customers will be comfortable with," said Threshold's Mr. Hecht. "And with Matisse's full object support and virtually endless scalability, our distributed EDGE IP will be 'future-proof.' That's the best migration path there is."

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