CERN openlab: Forging Connections Between Science and IT

The Large Hadron Collider (LHC) at the European Organization for Nuclear Research (CERN) is a multi-disciplinary project that has involved thousands of scientists, engineers, operations personnel, and administrators. To push the use of new technologies in support of the state-of-the-art IT infrastructure and information systems for the global scientific community working with the LHC, CERN devised openlab. Through close collaboration with Oracle and other leading IT vendors, CERN acquires early access to technology that is still years from reaching the general computing market. In return, CERN offers expertise and a highly demanding computing environment for pushing new technologies to their limits and provides a neutral ground for carrying out advanced R&D with various partners.

"Our slogan is, 'You make it, we break it,'" quips Wolfgang von Rüden, head of CERN openlab. "The participants obtain hardware, software, and networking products in the very early phase—often beta releases or pre-beta versions. We install them in our production environment at CERN and put them through rigorous testing. For the last seven years, Oracle has been helping us push database technology and related solutions forward, and in turn we are helping Oracle enhance its products."

For example, CERN has been an active contributor to Oracle Database 11g Release 2. During the beta testing period and in the months following, the CERN team performed extensive work using Oracle Streams, Oracle Automatic Storage Management, Oracle Active Data Guard, Oracle Real Application Clusters, and Oracle Advanced Compression. This collaborative effort yielded new techniques for replicating large databases, scaling compute capacity, and managing enterprise software environments. The openlab team also pioneered new virtualization techniques through close collaboration with the Oracle JRockit Virtual Edition team.

According to Juan F. Rada, a senior vice president at Oracle with worldwide responsibility for public sector, healthcare, and education industry solutions, openlab is an ideal test bed for evaluating and integrating new technologies and services. He says the openlab collaboration has had a decisive impact not only on the Worldwide LHC Computing Grid (WLCG), distributing information and results to a worldwide community of researchers, but also on the deployment of cutting-edge large-scale solutions that will become mainstream in the market.

For example, CERN uses Oracle Active Data Guard standby databases to replace existing servers and storage with new, more powerful models, enabling complete technology refresh with minimal downtime. CERN simply creates a physical standby database on the new technology platform and then executes an Oracle Data Guard switchover to move production to the new platform. Oracle customers can apply these principles to minimize downtime during OS upgrades, cluster resizing, migration from nonclustered to clustered systems, and other data-center moves.

"What makes CERN really useful to Oracle is the fact that we are able to test configurations and create proofs of concept in a very challenging production environment," Rada concludes. "Oracle has been able to develop better products as a result of the openlab collaboration. Our goal is to support the needs of the CERN scientific community while improving the technology for all Oracle customers."