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**Solution Showcase: DB2 for z/OS V.8
Lufthansa Systems Puts Database Maintenance
On Trial**



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Significant savings in areas you would never think about

Modern IT, with its various hardware and software solutions, undoubtedly influences the earning power of an enterprise. While IT plays an essential role in the fulfillment of enterprise-specific tasks, it also requires cost-oriented, permanent, and critical reviews of processes and human resources to determine their value to the organization's bottom line.

Lufthansa Systems is one of the world's leading IT service providers for the airline and aviation industry. A system integrator with one of the most modern data centers in Europe covers the entire spectrum of IT services, from consulting, through the development and implementation of applications, to reliable 24/7 operations. Based on many years of experience, a deep understanding of aviation processes, and extensive technological expertise, Lufthansa Systems is continually expanding its range of offers also to other industries. As an international IT service provider, Lufthansa Systems is focused on the continual expansion of its activities around the world. The company has a global presence and a sales structure that is oriented on its international target markets. Local points of contact ensure short response times and a close proximity to customers.

Competitiveness is the key to its success. Building blocks for this success are outsourcing of application development and parts of its maintenance activities, as well as in-sourcing of complete IT environments as a service provider.

Cost reduction, new fields of business, flexibility of the employees, and quality are the guidelines for added-value at Lufthansa Systems. Its meticulous IT review processes illustrate one of the ways the company secures its economical standing.

Processes On Trial

As long as Lufthansa Systems has been working with DB2 it has continuously put its existing processes and software solutions up for review. Over a stretch of more than 14 years it has always been company policy to examine and if necessary replace maintenance procedures with new processes that secure optimal DB2 operations.

In 2006, with DB2 V8, Lufthansa Systems once again placed its database maintenance on trial. Together with SOFTWARE ENGINEERING GMBH, Lufthansa Systems developed qualitative and quantitative goals to secure opportunities resulting from innovation and to protect return on investment.

From 1992 until 2006, a maintenance process had been in place for the 56 DB2 subsystems, which automatically executed the necessary DB2 utilities during the nightly batch window. That maintenance process withstood the test using the typical batch cycles of the past, but was no longer State of the Art in today's 24x7 environment. With the old process, the maintenance and recovery state was optimal only directly after execution of the utilities, but it deteriorated increasingly up to the next nightly run of the utilities. Often certain utilities could not be executed because the batch window was simply too small.

Lessons Learned

With SOFTWARE ENGINEERING GMBH, Lufthansa Systems is able to run utilities on demand during the day and night, as needed. **RealTime DBAExpert for DB2 z/OS** performs maintenance during non-peak times, which optimizes available resources and improves recoverability and performance through the execution of just-in-time utilities. E-Business on demand requires the abolition of the classical separation of online and batch processing. Better usage of

IBM's capacity-on-demand is enabled by distributed, workload-balanced execution because daily load sharing can be automatically and optimally controlled.

The goal was to change the processes in a way that utilized DB2 features to their fullest: plan real-time maintenance during the day; thus drastically reducing the recovery times and improving distribution of the CPU load.

"If we notice an object requires maintenance in the morning, we can't wait for a batch window during the night," says Brian Megraw from Lufthansa Systems' Infrastructure Services Division. He also points out that DB2 applications perform more optimally throughout the day, especially those with dynamic SQL. Lufthansa Systems runs 25 SAP R/3 systems that greatly benefit from this feature.

Getting the Best Out of IBM Innovations

IBM first introduced online features within its database utilities with DB2 V5 and completed the implementation of its inline functions in V6, with increased parallelism and the inline statistics collection during utility jobs. V7 was enhanced with Real-Time Statistics (RTS). V8 solves an old problem with autonomic space management and offers column distribution statistics for better RUNSTATS. "SOFTWARE ENGINEERING combines all of this and more into their RealTime DBAExpert for DB2 z/OS," adds Megraw. Using real-time statistics eliminates the normal catalog analysis required to determine maintenance needs. This takes the heat off the batch window.

RealTime DBAExpert monitors real-time statistics and compares them to predefined thresholds. As soon as RealTime DBAExpert detects a requirement for database maintenance, it automatically generates a utility job based on IBM online utilities and dynamically hands the job over to the job scheduler for immediate execution. Within this process, RealTime DBAExpert considers the system workload, as well as customer-specific exclusions concerning large objects, utility parameters, etc. RealTime DBAExpert guarantees the completion of a utility's execution within a desired time window by mapping the common usage of the database and performing Utility Runtime Prediction before turning it over to the job scheduler. Once scheduled, RealTime DBAExpert monitors the utility from start to finish, and if errors occur during its execution, another component automatically resolves the error. Like DB2 V8, RealTime DBAExpert also solves the problem of exploding spaces (Autonomic Space Management), but it uses fewer resources than V8. Additionally, an LPS and SMS Storage Group Audit is included to complete space management requirements.

RealTime DBAExpert's RUNSTATS Avoidance eliminates 75 to 95 percent of the "Optimizer" RUNSTATS, thus eliminating the CPU overhead and catalog contention caused by RUNSTATS.

To REBIND or not to REBIND? This is no longer a question because the integration of **Bind ImpactExpert for DB2 z/OS** with RealTime DBAExpert introduces automatic Change Control for Access Paths. At last comprehensive REBIND management which eliminates the risk of access path degradation is economically viable. Quite simply, if an access path remains the same, no REBIND is necessary; if it is improved, RealTime DBAExpert generates a REBIND, and if the access path deteriorates, the REBIND is suppressed. At Lufthansa Systems, the execution of unnecessary REBINDs entailed vast preventable costs. The negative economical impact of a bad access path on a critical application is immeasurable.

"With the Access Path Control Management feature, we automatically gain performance improvements and secure quality while simultaneously saving costs. System shutdowns resulting from faulty APARs that cripple performance are now impossible," states Megraw.

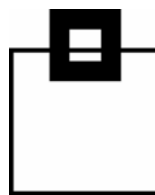
Increased savings potential results from RealTime DBAExpert's support of FlashCopy 2. The fastest backups are now possible while simultaneously relieving I/O. This makes the mainframe more efficient and reduces recovery times (RESTOREs). A Statistics Warehouse handles all relevant historical data and logs the tool's activities.

Lufthansa Systems performed the transition from classical maintenance to on-demand real-time maintenance step by step. A simulation mode provides the first impression, and enables the DBAs to see just how inefficient the current classical maintenance technology really is.

RealTime DBAExpert efficiently integrates classic maintenance products, thus, progressively and systematically moving the enterprise into a real 24x7 maintenance world, and eliminating the need for the batch window.

Today's auditing regulations require transparency and guaranteed defined processes. The RealTime DBAExpert interface to SOFTWARE ENGINEERING's new **Recovery Generator** and **Recovery HealthCheck** still have to be checked at Lufthansa Systems. Yet these tools should guarantee that the actual planned recovery time objectives and SLAs are within reach and provide alarms on a daily basis if any negative system changes occur.

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