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Oracle Database 11g: 5 Essential Steps to Upgrade Success

Most organizations today are aware that the task of upgrading software from one version to another is one that few IT professionals are eager to undertake. Nevertheless, the pain of planning, testing and executing an upgrade can lead to numerous rewards, ultimately granting access to the latest features and functionality. While upgrading to Oracle 11g cannot be completed in isolation and requires a fair amount of commitment to planning and testing, experts have revealed several key steps that can lead to upgrade success. Read this E-Guide and explore the 5 essential steps for getting through an 11g upgrade. Discover one company's early experience with Database 11g and how it enabled data compression as well as data center failover.

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Oracle 11g upgrade veteran offers step-by-step advice

Upgrading to Oracle 11g, the latest Oracle database release, requires a commitment to planning and testing, one veteran of the process told attendees at the Collaborate user conference being held here this week.

"You cannot do the upgrade in isolation," said Maria Anderson, senior database analyst, enterprise infrastructure services for Calgary-based Petro-Canada. "I know we think that as DBAs you do the upgrade and that's all you need to worry about, but you need to involve app support folks as well as the business users. The more time you spend in this part of the project, the more likely it will be a success for you."

There are several methods for completing the upgrade, according to Anderson. Customers can upgrade directly from one of three existing systems—9.2.04, 10.1.02 or 10.2.0.1—but others will have to take an extra step. The direct upgrade can be done with the Upgrade Assistant, Oracle's graphical user interface tool, or with scripting. Or customers can take an indirect route by using import/export functions (the most common method when creating a new instance on the same server) or via table/copy, which essentially copies over tables in a database linked with an older version.

"Export/import works really well for smaller upgrades," Anderson said. "The direct methods will upgrade the database in place. Afterwards, you'll end up with one 11g instance. The indirect [route] will give you two databases, the old one and the new."

While it may not be much fun, Anderson advised attendees to follow all the documentation they can get their hands on: the new features guide, the upgrade guide, the Oracle Technology Network's 11g homepage, the Oracle Independent User Group website, and select Oracle journals and other expert books that are already emerging.

Anderson then laid out a step-by-step process for getting through the 11g upgrade.

Step 1: Planning

"I make a list of databases I'm going to upgrade and rank them from highest to lowest," she said. "I'm not going to upgrade the HR or financial system first. I'm going to pick instances that are very small where the visibility is quite low."

From there, DBAs should review the new features, research existing bugs—those that have been resolved and those that haven't—and develop a high-level plan, including the business users and application support. Closer to the target go-live date, that plan should then be revisited, involving business users in choosing the dates for the upgrade development test and production.

Step 2: Testing the plan

Begin with testing the upgrade itself. Are problems arising? Has anything new been introduced that needs to be accounted for? "You just want to make sure the upgrade worked and it can connect to your database," Anderson said.

DBAs also need to run a functional test—for example, "Does the job I run every Monday still work?"—then a performance test.

"You want to make sure your SQL doesn't perform any worse than it did before," Anderson said. "Hopefully, it runs faster. This is where you cannot do upgrades in isolation."

The load test, or stress test, is often overlooked because it's a difficult task, but it's important because that's where a lot of upgrades get into trouble. Testing the Oracle client is similarly challenging, yet critical. Ideally, any issues with these will have been caught in the upgrade test, but it's an important step, Anderson said.

Step 3: Creating documentation

Anderson developed a three-page template for her upgrade, with a list of all the people involved and their contact information, each step of the upgrade with commands and start and stop times, and a list of the backup steps in case the 11g upgrade runs into problems along the way.

"Why put myself through so much work?" she said. "It is a lot of work, but it makes the production upgrade so much easier. Also, it serves as supplement for change management. What are the steps involved? What do you do if you have to back out? It's an audit trail for compliance requirements."

This will also serve as working documentation for the next upgrade.

DBAs should also take care in setting the COMPATIBLE parameter and testing it thoroughly before setting it to 11.0.0.

"You can't really go back," Anderson said. "It actually changes the structure of the underlying logic. Once it's set to 11.0.0, you're not able to downgrade. If there's an app issue or you hit a bug, you're going to have to restore your database to a prior release."

Step 4: Preparing

The 11g upgrade will change items in the scripting environment. For example, DIAGNOSTIC_DEST replaces the bdump, cdump and udump locations.

"You need to think about these things before you upgrade to 11.1," Anderson said. "11g uses version4 time zone files. If you're not using version4 time zone files, you need to apply a patch for that. Now is a good time to review your backup strategy."

Step 5: Upgrading

"The first-time install should not be done on a production server for the first time," she said. "Not that I had any problems with an installation, but it's just not good practice."

In fact, Anderson said, the upgrade went surprisingly like the 10g upgrade.

When running with the utlu11i.sql script, DBAs need to use the upgrade assistant or first run this step themselves against the database being upgraded.

"I took it from $Oracle_Home/rdbms/admin, spooled the output and ran the script," Anderson said. "It gives you information about the database, the things you need to change and modify before you upgrade."

The Database Upgrade Assistant is the preferred method for upgrades, she said.

"I like to have control, and you have less control with the assistant, but you don't have the ability to miss a step," she said. "It's the only way to upgrade your SAP Oracle databases."

Ultimately, Anderson encourages DBAs to be proactive when it comes to upgrading to 11g.

"Initiate these projects," she said. "If you wait for your clients, often you're in a hurry, and it takes time to get these things done. Plus, it makes you look like you're doing a good job."

It's important to remember to work with the business users so they understand the process and to be aware of all bugs and fixes.

"Document the technical steps," she said. "I call it a Technical Implementation Plan (TIP). If you're doing this with a team, it's much easier to plan. The time you spend planning is never, ever wasted."

Oracle Database 11g gets early use at Burlington Coat Factory

Mike Prince could be considered the Michael Jordan of Oracle OpenWorld conferences. As the CTO for clothing maker Burlington Coat Factory in New Jersey, Prince has a close relationship with Oracle and speaks regularly to conferences attendees about trying out the latest Oracle technologies—like Oracle Database 11g—to much fanfare. In this two-part interview from the most recent Oracle OpenWorld conference, Prince talks about his experience testing out Oracle Database 11g, his company's IT setup, and the features of Database 11g that enable data compression and data center failover. Here's what he had to say:

T*ell me about your experience with Oracle Database 11g?*

Mike Prince: We have it up and running. We put a push on getting it up because we wanted to kick the tires before OpenWorld [because we had a DBA presenting sessions there.] And it came up easily. It was one of these things where we have a gazillion critical projects going on all at once, and it was hard to steal resources to do something forward-looking. But we put one of our top guys on it and he got it up very quickly. There weren't any major obstacles. We're pretty good at installing Oracle and bringing up data now, having gone from [version] 8 to 9 to 10 in the last three years. We've gotten pretty adroit at it.

What are some of the 11g features you've tested?

Prince: We did test a couple of the key features that we were most interested in. Now, I had limited insight into what was in the release when we got it. I had been briefed a year ago about it as part of a [Customer Advisory Board] for Oracle's database group, but the features weren't really nailed down yet. One of the features we picked to exercise was [data] compression because we think that's going to be a money-saver. We're looking to put a tactical improvement to the infrastructure in place in the midst of a lot of critical business re-engineering projects and we're going to have to justify it. A six figure justification in storage savings probably would get us enough traction that we wouldn't have to bring in a lot of non-technical people along to [explain the business benefits].

Could you tell how Burlington Coat Factory's IT operations are set up?

Prince: We have two data centers. They're ten kilometers apart, they're both in New Jersey, and they're both near the major distribution centers in the Delaware Valley. We basically have half of our assets in one data center and half in the other. And our in [Oracle Database 10g] implementations—which make up almost all of the database implementations right now although there are a couple of stragglers that are application constrained to older versions—we have half the databases in one location and half in the other. We have two clusters, and on each cluster we run the Oracle Data Guard copies for the other cluster. So basically all the data is always in both data centers in real time.

If you had to failover from one data center to the other, how would that play out?

Prince: The way we're configured right now is we really don't have as many nodes on the Data Guard as we have on the production side and if we had to failover rapidly we'd have a lot of reconfiguration to do. But we don't want to spend the money on the assets to have the thing sitting there half utilized. So we know that we're protected from disaster and we could certainly operate well enough on one data center once we got it running. And there's a lot more things Oracle has that would help automate that switchover, but we haven't gotten to putting that all in place yet. I think we'll end up doing it in the [Oracle Database 11g] context.

With software upgrades, pain leads to gain

Upgrading software from one version to another is a task that few IT professionals are eager to undertake.

Experts point out, however, that whether you're upgrading an Oracle Database, an Oracle business application, or any other application for that matter, the pain of planning, testing and execution can lead to bountiful rewards—and those rewards begin with access to the "latest and greatest" features and functionality.

For example, Ari Kaplan, president of the Independent Oracle Users Group (IOUG), said that Oracle Database customers who put aside their fears of downtime and upgrade from 10gR1 to 10gR2 will see an immediate improvement in their ability to deal with regulatory compliance issues.

"In Oracle 10g Release 2 there are [two features] called Oracle Data Vault and Oracle Audit Vault, which are incredible for compliancy and security," Kaplan said. "So if your company has a requirement to adhere to—let's say—Sarbanes-Oxley, then that's basically a mandate to do an upgrade."

But whatever the reason for the software upgrade, experts say there are some important steps to take that can help lead to upgrade success.

For starters, companies need to research and fully understand the new features and functions that are available in the latest version, according to Cal Braunstein, chairman, CEO and executive director of research with the Robert Frances Group, a Westport, Conn.-based IT consultancy.

"You want to understand the enhancements, what problems have been fixed, etc.," he said. "That way, you can make a determination as to the value-add to your organization."

For example, Stephen O'Grady, an analyst with RedMonk, a Denver-based IT consultancy, said that increased security may be the key reason to upgrade a database.

"You might be running off a database that's old enough that support has been terminated," he said. "So you're not protected in the case of maintenance fixes or security problems."

Experts say it's also important to keep up with patches whether you're doing an upgrade or not, including those patches issued by the vendor and any patches or customizations that users may have come up with on their own.

Braunstein said a common problem along these lines occurs after a company has discovered a bug and worked with the software vendor to come up with a patch.

"You could have been the first one to find a problem, worked with Oracle, and they got you a patch that works," he said. "But when Oracle finally did a standard release for this bug, they may have found that what they gave you was not a perfect generic solution, so they did something else generically."

Finally, Braunstein said, make sure to gain a keen understanding of any prerequisites for upgrading to the latest version, because there may be other applications to take into consideration.

"For example, to apply certain parts of a database change, it may require that you have incorporated the latest service pack from Microsoft, or those modifications won't work — and you weren't even planning on incorporating the latest service pack," Braunstein said. "So it's not just looking at the product itself but looking at other prerequisites that may apply."

So you want to be an early adopter?

Most organizations don't want to be first in line to adopt new software versions because they figure it's safer to let others work out any potential bugs. Some companies have no choice but to upgrade early, however, because of internal or external mandates.

For organizations that fall into the latter category, making sure the vendor has done its due diligence can help ensure that the often-risky early-adoption process goes as smoothly as possible.

According to Braunstein, it's important to have a good relationship with the software vendor and to leverage that relationship to make sure that the vendor has sufficiently tested the new version.

"You, as a user, have a good feel for the testing that certain vendors have done on certain products," he said. "Over time, you know whether you can trust Oracle, Microsoft, IBM or whomever it may be."

It's also important for users to make sure that their organizations have a compelling business reason to upgrade early, Braunstein said, because upgrading simply to remain current may introduce unnecessary risk.

"If you know that [the new software version] has been extremely well tested and there is urgency for you to go to it, then you might find that the risk is worth taking," he explained. "On the other hand, if you know that you're going to experience a number of problems and you have no real compelling reason to be leading-edge, then you'll do what most people do and continue to wait until it's better shaken down."

For Oracle customers, IOUG's Kaplan said, being an early adopter may be a less risky proposition than it has been in the past.

"I would say that Oracle 10gR1 was a great testament to that because it was a very stable product," Kaplan said. "Oracle really did a good job involving beta customers and involving their rigorous testing processes. So when 10gR1 came out, I think that people were positively surprised that it wasn't as buggy as other releases."

Oracle shows off Database 11g

Database 11g, the long-awaited overhaul of Oracle's flagship database management system (DBMS), made its official debut today. But the software isn't available for download yet.

Database 11g, which is entering the market after a nine-month beta testing period, offers a host of fully automated features, new testing-related capabilities, better overall performance, and many other new capabilities that are in line with the release's key themes of "innovation" and "change management," according to Oracle.

"Oracle has invested heavily into self-tuning capabilities, including automated storage and memory management and intelligent tuning advisors," said Donald K. Burleson, a well-known independent Oracle consultant. "Now, in 11g, Oracle closes the loop and offers intelligent automation tools to create a self-healing database. The most important 11g new automation features include fully automated memory tuning and fully automated SQL tuning, a major advance in database technology."

Oracle executives led by Charles Phillips, company president, were set to demonstrate Database 11g at an event in New York City today. Database 11g is the company's first major DBMS revamp since it released Database 10g about four years ago. Oracle said the software will be commercially available on Linux sometime in August. Release dates for Database 11g on Microsoft Windows and other platforms have not been announced.

Database 11g features and functionality

Database 11g offers nearly 500 new features covering a wide range of areas, including manageability, high availability, scalability, infrastructure, content management, and business intelligence.

"Probably the most important [new feature] is our Real Application Testing capability," said Robert G. Shimp, a vice president with Oracle's global technology business unit. "This allows us to dramatically shrink the time it takes for a customer to do a database upgrade."

Oracle says the system offers enhanced self-management and automated features designed to help organizations manage enterprise grids and deliver on service-level agreements. Key among them are automatic SQL and memory tuning.

Jeff S. Buelt, the director of information technology at Pro Staff, a Minneapolis-based temporary staffing firm that runs several versions of Oracle, says features like automatic SQL tuning will be a welcome change when the time comes to upgrade.

"We have lots of users running queries and reports," Buelt said. "It would be very nice to be able to tune the system easier and faster."

Andy Mendelsohn, Oracle's senior vice president of database server technologies, said other new features in Database 11g, such as enhanced partitioning and storage-related capabilities, were created to help organizations

deal with the dramatic growth in data resulting from relatively new data-retention regulations like Sarbanes-Oxley.

Along those lines, Database 11g offers enhanced data compression capabilities. Experts point out that compressing data could have an overhead in terms of performance. But they add that the performance cost is probably negligible compared to the storage-related savings.

"The sizes of databases are growing exponentially [and] the whole cost of storage is getting out of control," Mendelsohn said. "By using a combination of our partitioning technologies—what we call Information Lifecycle Management—and our compression technologies, you can go from in the order of a million-dollar storage system down to $50,000, or something of that sort."

Database 11g also offers Database Replay and SQL Replay capabilities, which give users a better understanding of how database changes affect SQL performance.

"The Database Replay basically provides the ability to replay the workload from production onto test environments," said Noel Yuhanna, a database analyst with Cambridge, Mass.-based Forrester Research. "It really minimizes some of these challenges and issues which customers are having around application deployments. We believe that around 20% of applications typically fail because [proper] testing is not there, and the Database Replay mitigates this risk."

Database 11g's newly included Oracle Data Guard technology lets companies use their standby systems to improve performance in production environments while providing protection from system failures and disasters, according to Oracle. The technology enables users to take snapshots of database systems for testing, reporting, backups and rolling upgrades.

Oracle Database 11g will also offer significant new XML-related features and enhancements. Oracle says the main XML features focus on XML DB, the company's XML storage and retrieval technology, and they include a new binary XML data type, a new XML index, and enhanced support for XQuery and other emerging standards. Oracle expert Donald Burleson wrote that Database 11g provides support for schema-based Document Type Definitions, which let users describe the structure of XML documents.

Some other new Database 11g features include Quick Fault Resolution, the ability to automatically retain all the diagnostics related to a fault; online table and index redefinition; Database Repair Advisor, a wizard that helps DBAs deal with the fault diagnosis and resolution process; a new high-performance Large Objects infrastructure; native Java and PL/SQL compilers; and a re-engineered driver for PHP.

An Oracle and Microsoft role reversal?

Oracle is big with large companies, but hopes the fully automated features of Database 11g will help it achieve greater mindshare among smaller organizations, a market dominated by Microsoft SQL Server, according to industry experts. Meanwhile, they say, Microsoft is hoping to push SQL Server further into the high end of the market.

"SQL Server is driving up, Oracle is driving down," Burleson said. "And part of that drive-down that Oracle is doing in 11g is putting artificial intelligence in the database. That's where I think that Oracle is going to beat the daylights out of SQL Server."

Resources from Oracle

Oracle Database Security: Preventing Enterprise Data Leaks at the Source

Oracle Advanced Security Technical White Paper

Oracle Database 11g for Data Warehousing and Business Intelligence

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