DATA & ANALYTICS SERVICES

Upgrade Your Database Now

moser consulting

MOSERIT.COM

Indianapolis North HQ
6220 Castleway West Drive
Indianapolis, IN 46250
317.596.8022

Indy Downtown
30 South Meridian Street
Suite 600
Indianapolis, IN 46204

Baltimore
17 Governors Court
Windsor Mill, MD 21244
443.380.4400

Is it time to upgrade your database?

For companies using Oracle Database, 12C (or version 12.2.0.1) has been widely adopted for both Standard and Enterprise versions since its release in 2017. However, Oracle is sunsetting support for 12C as of March 31, 2022. While it will continue to receive Sustaining Support (as all Oracle Databases currently do), there are significant disadvantages for companies that choose to remain with older versions, including a lack of security patches, the potential for not meeting regulatory requirements, and the loss of product support.

To avoid these potential disadvantages—and more—companies that are using Oracle Database 12c should upgrade to Oracle Database 19c as soon as possible. In this article, we'll explore what it means to upgrade your database, why doing so is so critical, and what Oracle Database upgrade path to 19c looks like, from pre-upgrade requirements through installation and ongoing support.

WHAT DOES A DATABASE UPGRADE MEAN?

To begin, a database upgrade involves transforming an existing database environment, such an Oracle Database 12c, to a new environment like Oracle Database 19c. This upgrade includes all installed components and associated and integrated applications. In an upgrade, the data dictionary is upgraded, but the data itself is not touched, impacted, changed, or moved.

The database release cycle for most major providers is between 18 and 36 months, which means companies looking to keep up with the most up-to-date version may be looking at a database upgrade every two to three years. That said, because most providers offer some version of ongoing support for a couple of years after a new version has been released, companies can stick with a particular version of a database for longer periods of time if they choose.

When should the database be updated? Most IT experts agree that the right time to upgrade a database generally falls in line with when a provider ceases to provide extensive, high-level patches and supports that ensure data security and functionality. Because Oracle Database will stop providing Limited Error Correction Support on March 31, 2022, now is an excellent time to start the upgrade conversation.

WHAT IS THE DIFFERENCE BETWEEN MIGRATION AND UPGRADE IN ORACLE?

While the two terms can often be used to mean similar things, the truth is that a database upgrade is very different from a database migration. As we discussed above, a database upgrade simply moves your existing database environment to a new version of that same environment.

A database migration, alternatively, refers to the movement of data from one environment to a whole new environment. Migrations are generally used when a company seeks to move their database to a new or different hardware or operating system platform. Additionally, migrations are also used when moving to a new character set. During a migration, the data itself should remain fully intact, although the structure of the data may change in the process. As a reminder, a migration does not involve moving to the latest version of a database—that is exclusively done during an upgrade.

Database upgrades and migrations are handled as two wholly separate processes. If a company is seeking to both upgrade and migrate their database, the upgrade is typically handled separately after the migration has occurred.

This paper will focus on database upgrades. However, for those companies interested in database migration, we encourage you to reach out to our team at Moser Consulting to discuss your needs and how we can help.

WHY SHOULD I UPGRADE MY DATABASE?

Software sunsetting is something every business needs to address. Companies regularly schedule software to go to end-of-life at set intervals, and sticking with old versions means you'll miss out on key features and patches. Upgrading in a timely manner can provide all of the following advantages—and more.

Ensure Ongoing Support

Companies like Oracle only offer ongoing support for their database versions for a set period of time. For example, their Premier Support (PS) is typically offered for two years past the original release date. Other support tiers, like Extended Support (ES) or Limited Error Correction Support, do run longer when they are available. For companies using Oracle 12C (version 12.2.0.1), Premier Support expired on November 30, 2020, and the Limited Error Correction Support will end on March 31, 2022.

After the ES or Limited Error Correction Support period ends, companies using dated versions of a database will only have access to Sustaining Support, which essentially grants access to technical support. Companies will no longer have access to:

- New updates, security alerts, and critical patches
- New legal and regulatory compliance updates
- New scripts

For companies currently using Oracle 12c, updating to 19C will afford them the opportunity to enjoy Premier Support until April 2024 and Extended Support until April 2027.

Keep Your Database Secure

In 2020, there were nearly 30,000 cybersecurity incidents worldwide. For most companies, the potential for cyberattacks has become a when, not an if. Databases, especially those that store sensitive or personally identifiable information, must adhere to the most stringent security measures possible. Database companies, including Oracle, only provide ongoing security updates and patches to the databases they're currently supporting. Companies that fail to upgrade a database that's no longer being supported are putting their data at risk.

Resolve Bugs, Glitches, and Other Issues

For peak productivity and performance, teams need their database to be fully operational. Troubleshooting on an outdated database can be difficult, especially when the database is no longer receiving regular patches and updates, and teams may find their database simply isn't operating to its full capacity. Most database upgrades are able to i dentify and repair the majority of bugs, glitches, and other common technical issues, reducing downtime and increasing optimization.

Enjoy New Features

Most database upgrades offer exciting new features that can enhance productivity and efficiency. Oracle 19c offers added functionality in the following areas:

- Application Development
- Availability
- Big Data and Data Warehousing
- Database Overall
- Diagnosability
- Performance
- RAC and Grid
- Security

While the full list of new features is extensive, some of the most exciting include:

- **Automatic Indexing:** Using Machine Learning algorithms, this feature automates various index management tasks, including the creation, rebuilding, and dropping of indexes.
- **Active Data Guard DML Redirection:** With Oracle Database 19c, DML operations can be run on Active Data Guard standby databases.
- **Hybrid Partitioned Tables:** With this feature, partitions may occur in Oracle Database segments and in the external files and sources, which enhances the functionality for big data.
- **JSON Support:** With 19C, Oracle has simplified and improved the syntax of JSON functions and added the ability to run a partial JSON update.
- **SQL Quarantine:** Another automated feature, this tool automatically quarantines SQL statements that are terminated by Oracle Database Resource Manager for excessive consumption of CPU or input/output resources.

Maintain Sustainability

Older Oracle databases that solely offer Sustained Support do not receive certifications for new third-party products or versions. Companies that plan to upgrade their platforms to the newest version of an operating system, for example, may eventually find that older databases simply aren't compatible. What's more, like any major software update, it's easier to perform a database upgrade if you're already operating on a current version. Lagging too far behind with upgrading will undoubtedly make it more difficult to upgrade when the time comes.

Reduce Operational Costs

While there may be some upfront operational costs associated with upgrading your database, there is the potential for long-term decreased costs for companies. For example, as databases become more complex—with elements of artificial intelligence and machine learning—employees can work smarter, better, and faster. In fact, some of the most advanced features can free up employee time to focus on other elements of their jobs.

> ***Some database upgrades are designed to take up a smaller digital footprint. This can reduce overall storage costs, which is especially important for companies operating very large databases.***

HOW CAN I UPGRADE MY 12C DATABASE TO 19C?

We've covered the benefits of upgrading to a currently-supported version of a database. Now it's time to explore the finer details and how-to points. How do you actually begin the process of upgrading your database? What steps should you take? What pitfalls do you need to look out for?

The good news is, Oracle provides extensive upgrade documentation that should cover just about any circumstance your company finds itself in. We'll cover the high points in this section and link you to resources to allow you to gather further information.

> ***Another piece of good news? Moser's DBA Services team is well-versed in Oracle and other top-tier databases. Our team can support your company in upgrading or migrating your database to 19c. We'll talk more about our team of experts at the end of this article.***

WHAT UPGRADE METHODS AND PROCESSES ARE AVAILABLE FOR 19C?

Oracle Database supports the use of the following methods and tools for upgrading to 19c.

- **AutoUpgrade Utility:** This tool identities issues or bugs that need to be addressed before upgrades, deploys your upgrade, and performs essential post-upgrade actions.
- **Database Upgrade Assistant (DBUA):** Perhaps one of the most popular methods, this tool provides a graphic user interface that guides teams through the entire upgrade process. DBUA can be used during installation with Oracle's Universal Installer or it can be used as a standalone tool.
- **Manual Upgrade:** Some teams choose to move forward with a manual upgrade by using command-line utilities and the Parallel Upgrade Utility.

If you are looking to migrate before upgrading, Oracle also offers several migration tools, including Oracle Data Pump, Oracle GoldenGate, Fleet Patching and Provisioning, and more. Detailed information about the tools and methods provided by Oracle for upgrading and migrating can be found in their upgrade guide.

WHAT ARE THE PRE-UPGRADE STEPS YOU FOLLOW?

Before beginning the upgrade process, companies should first follow a series of pre-upgrade steps to prepare for the transition. These steps will help ensure that your database is prepared for the upgrade and that your team is on a path to success. When upgrading to 19c, Oracle recommends completing the following activities:

Learn About New Features

Members of the team who will be using the new database should familiarize themselves with any new features that will be available in the new version. Oracle offers an extensive list of feature updates for 19c.

Complete a Pre-Upgrade Information Check with AutoUpgrade

Run the AutoUpgrade utility (autoupgrade.jar) in analyze mode to obtain a list of tasks that must be performed before upgrading your database.

Review Any Depreciated Features

Review depreciated features for the new version of the Database to find out if you will need to make any changes to current processes. Oracle provides a list of depreciated features and possible alternatives for Oracle Database 19c.

Determine an Upgrade Method

Choose from using AutoUpgrade Utility, DBUA, or a manual upgrade process.

Settle on a New Location for Oracle Home

Before beginning an upgrade, companies must choose a location for Oracle home for the new database version. This must be separate from the Oracle Home of your existing version.

Create a Test Plan for the Upgrade Process

When upgrading your database, it is critical to perform rigorous testing of both your database and your applications. This can help ensure the success of your eventual upgrade. Your test plan should include: upgrade testing, minimal testing, functional testing, high availability testing, integration testing, performance testing, and volume and load stress testing. Find out more about developing a test plan for Oracle Database with Oracle's documentation.

Decide on Password Authentication for Expired Accounts

Beginning with Oracle Database 19c, expired and locked default Oracle accounts that haven't had their passwords reset before the upgrade will be set to "No Authentication" after the upgrade. If you want to prevent this, you must select other options.

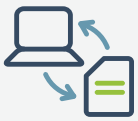
Backup Your Files

In the event of any issues in the upgrade process, data backups are crucial. Teams should develop a backup strategy for their database and any other essential files.

WHAT ARE THE ORACLE DATABASE UPGRADE STEPS FOR 19C?

While every company may follow a slightly different Oracle 19c upgrade path, Oracle lays out six basic steps that need to be performed during every upgrade.

STEP 1 PREPARE TO UPGRADE



If you've completed the list of pre-upgrade activities and tasks above, you've already knocked out this step. As a reminder, your plan should account for the following:

- **Which upgrade path will you use?** Moser recommends any company currently operating with version 12c to upgrade directly to 19c. Companies that do so will receive Premier Support until April 2024 and Extended Support until April 2027.
- **Which upgrade method will you use?** There are pros and cons to each method, although using the DBUA is a popular choice.
- **What is your testing plan?** Establish how you will test the upgrade process and the new database to ensure everything runs smoothly with as little downtime as possible.
- **What is your backup strategy?** In the event that something occurs, you must have a backup database in place.
- **Have you followed all of the pre-upgrade steps?** Ensure you've followed all the recommendations and have carried out the appropriate manual system updates.

When upgrading, we recommend that companies run multiple releases of their database software at once, with the existing version as your production environment and the new version as your test environment. This can help minimize disruptions.

STEP 2 TEST YOUR PROCESS

Once you've developed a plan, work can begin. To start, teams should perform a test upgrade on a test database. The test should be done in a testing environment that will not at all interfere with the production database and environment. That said, your test environment should replicate—to the largest extent possible—your production environment to achieve the best results.

STEP 3 TEST THE UPGRADE TEST DATABASE

Once you've created a test database with the new Oracle Database version, you need to run tests on it, including all the tests you planned to run in your pre-upgrade plan. For example, you may perform:

- Upgrade testing
- Minimal testing
- Functional testing
- High availability testing
- Integration testing
- Performance testing
- Volume and load stress testing

Make note of any bugs, glitches, or anomalies that may need to be addressed before moving forward. Repeat your tests until your results meet your criteria for success.

STEP 4

PREPARE THE PRODUCTION DATABASE

After you achieve success with your testing, you can move onto preparing your production database for the upgrade. Your preparation should include the following:

- Ready your production database to ensure the upgrade is successful.
- Schedule the downtime that will be required for the upgrading process. Ensure to communicate this out with users and other key stakeholders.
- Back up the production database.
- Ensure a fallback strategy is in place. Before moving forward, test your fallback strategy for functionality. Ensure your downtime window accounts for this possibility.

STEP 5

UPGRADE THE PRODUCTION DATABASE

After all the planning and work, this is the step where your upgrade will actually occur. Upgrade your production database, perform a full backup of the new production database, and complete any other post-upgrade tasks (including testing) that must be done.

STEP 6

TUNE AND ADJUST THE NEW PRODUCTION DATABASE

Once the production database has been upgraded, there are just a few more tasks that must be completed. You'll need to:

- Tune your new database to the new release. Your new production database should perform to the same standards or better than when you were using the previous version.
- Decide on the features you're going to use and update the necessary applications to implement them.
- Determine any new DBA procedures that will be needed and document them accordingly.

> ***Once these tasks have been completed, you've run successful tests, and all of your applications have been updated to work with your new database, you can move it to the production environment.***

Bonus: Let Someone Else Take Care of it

Does that sound like a lot? It certainly is, especially for already-busy IT teams who have a lot on their plates. That's why more and more companies are using firms like Moser Consulting to assist or manage their database upgrade or migration processes. Our DBA Services team is staffed by elite database administrators who can help you plan, implement, and manage your traditional and emerging databases, including on-premise and cloud databases.

WHAT ARE THE POTENTIAL RISKS OF UPGRADING WITHOUT A PLAN?

After all that, it's not uncommon for companies to want to speed up the upgrade process of a database. It takes time, afterall. However, moving forward without a solid plan can lead to cut corners and serious negative consequences. The most significant risks that companies may face if they upgrade without a plan include:

Improper Adoption of New Features

One of the most exciting elements of upgrading to a new version of a database is the possibility of new features that can boost efficiency, automate tedious tasks, and generally provide a better user experience. Failure to upgrade to a new database without a plan means that teams may not be aware of new features, or they may improperly adopt them—resulting in errors or bugs, downtime, and frustration.

Performance Issues

Another of the most exciting reasons to upgrade to a new database is the possibility for better performance. Without a clear-cut plan for testing, re-testing, and tuning your test database and production database, though, you may end up with performance issues. Correcting these issues takes time, resources, and the potential for unscheduled downtime.

Downtime

No one likes downtime, least of all C-Suite executives and other high-profile stakeholders. Improper database upgrading can lead to downtimes—sometimes substantial downtime. This can cause teams to scramble and have to take several steps backwards to identify and correct the issue. Putting in the time to plan ahead can prevent these unplanned and inconvenient outages.

> ***Upgrading your database is critical, and moving forward with a solid plan is the only way to ensure success.***

MOSER CONSULTING

Database Services You Can Trust

If you're one of the many companies looking to upgrade from Oracle Database 12c to Oracle Database 19c, you're not in it alone. At Moser Consulting, we partner with companies of all sizes to manage and assist with upgrades, migrations, routine maintenance, security, backups, new installations, reporting, and more.

Our expert DBA Services team has extensive knowledge in SQL Server, including monitoring, maintenance, replication, tuning, upgrading, migrating, auditing, reporting, and high availability solutions to meet your business' unique needs. Whether your database operates on premise or in the cloud, our team is here to help. Interested in learning more about our full line of services? Reach out today. We'd love to partner with you to find the best technology solutions for your business. If you want help now, click **here**.

moser consulting
MOSERIT.COM

Indianapolis North HQ
6220 Castleway West Drive
Indianapolis, IN 46250
317.596.8022

Indy Downtown
30 South Meridian Street
Suite 600
Indianapolis, IN 46204

Baltimore
17 Governors Court
Windsor Mill, MD 21244
443.380.4400