

Improved Business Continuity with Oracle Database 23ai

Utilize the capabilities of Oracle Database 23ai with Oracle JD Edwards EnterpriseOne for improved business continuity and system availability

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Purpose Statement

This document provides an overview of the testing Oracle JD Edwards EnterpriseOne with Oracle Database 23ai to provide better business continuity and system availability. This document describes the features and enhancements included in Release 26 (Tools Release 9.2.26.0). It is intended solely to help you assess the business benefits of upgrading to Release 26 (Tools Release 9.2.26.0) and planning for the implementation of Oracle Database 23ai.

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Executive Summary

Database systems are a critical component of enterprise resource planning systems. The availability of the database plays a crucial role in defining the continuity of transactions and operations for businesses. Any disruption in the database can result in loss of connectivity between the JD Edwards EnterpriseOne components and the database leading to business downtime that impacts operations, revenue, and productivity. JD Edwards EnterpriseOne customers can benefit from seamless operations if the database is resilient and can handle disruptions gracefully without any impact on the business. Better business continuity and system availability defines the performance, scalability, availability, and security of JD Edwards EnterpriseOne.

Oracle Database 23ai is the latest long-term support release of Oracle's flagship database. This monumental release, available now, includes over 300 major new features and thousands of enhancements. Oracle Database 23ai includes many game-changing innovations that deliver architectural simplicity and architectural scalability for data-centric applications. It eliminates the root cause of issues that have plagued data management for decades. The focus areas of Oracle Database 23ai are developers, mission-critical, and AI. Some of the key features that are part of the Oracle Database 23ai are: AI Vector Search, JSON Relational Duality, Operational property graphs, Lock-free reservations, priority transactions, SQL Firewall, True Cache, Rolling patching and so on.

Oracle Database 23ai has multiple enhancements that improve transaction continuity for JD Edwards customers. These enhancements enable graceful management of events like Real Application Cluster (RAC) failover thereby minimizing disruptions to JD Edwards EnterpriseOne customers. This document provides an overview of the performance characterization of Oracle JD Edwards EnterpriseOne with Oracle Database 23ai enhancements and highlights how these enhancements provide better business continuity and system availability for JD Edwards EnterpriseOne customers.

Overview of Oracle Database 23ai Improvements

This document describes the results that were obtained when implementing Oracle Database 23ai for review. The goals of the tests and resulting observations are summarized below:

1. Review the Oracle 23ai configuration and failover settings.
2. Review of the mitigation window for JD Edwards EnterpriseOne failover processes. The mitigation window is the time from the initiation of an Oracle database planned failover event to the time that JD Edwards EnterpriseOne functionality is restored.

The mitigation window was 19 minutes with Oracle Database 19c, in Oracle Database 23ai the mitigation window was reduced to less than 5 minutes. The advances in cursor management in both Oracle Database 23ai are the reasons for this 75% improvement benefit.

3. Moving to Oracle Database 23ai with the improvements in the JD Edwards EnterpriseOne also yielded no observed errors in either the Oracle database or EnterpriseOne application logs.

Improvements in cursors, caching, and handling of JD Edwards EnterpriseOne applications was a primary goal of the release and support of Oracle Database 23ai and JD Edwards EnterpriseOne Tools Release 9.2.26.0. These adjustments have allowed a more stable and cleaner transition during failover.

Overall, both the latest JD Edwards EnterpriseOne Tools Release and Oracle Database 23ai improved the continuity and stability for supporting Oracle RAC configurations and minimizing interruptions. For information on the database changes, support, and deprecations, see [Oracle Database 23ai Upgrade Guide](#).

Oracle Database Failover Window

The second section of this document for improved application continuity is to discuss the difference in behavior of Oracle database failover events between Oracle Database 19c and Oracle Database 23ai versions. Oracle database

failover is defined by Oracle as events that are triggered when a primary database becomes unavailable, and a standby or secondary database takes over the primary role to maintain continuous database service. These events can be categorized based on the underlying technology and the nature of the failover (planned or unplanned). JD Edwards EnterpriseOne only supports planned maintenance failover events, and this document will only cover this failover event.

JD Edwards EnterpriseOne processes must reconnect to the standby or secondary node when the failover event is raised and connections to the Oracle database instance is unexpectedly severed. In an Oracle planned maintenance event, all JD Edwards EnterpriseOne processes are idle prior to the planned failover event.

The Oracle database failover window is the time when the first JD Edwards EnterpriseOne process database connection of a JD Edwards EnterpriseOne process is severed to the time JD Edwards EnterpriseOne is ready to accept new requests to its processes. In Oracle Database 19c, it was measured that this Oracle database failover window was approximately 20 minutes, in Oracle Database 23ai, this failover window shrunk to less than 5 minutes, which is also the time of the Oracle database drain timeout.

In the Oracle database, drain timeout refers to the maximum time allowed for active sessions connected to a database instance or service to complete their work and disconnect for a planned maintenance failover event. For this reason, it is recommended that all long running customer processes be suspended prior to the planned maintenance window as there is exposure to data integrity during these periods of transition. This mechanism is crucial for achieving continuous availability and minimizing application impact during planned maintenance activities.

At present JD Edwards EnterpriseOne does not support the implementation of Transaction Application Continuity (TAC). The automatic reconnection feature goes further than simple Application Continuity (AC) in reconnecting application sessions to an available database instance. In TAC, if a transaction was in-flight at the time of the outage, TAC attempts to replay that transaction on a new connection.

Oracle Database Application Continuity

The last section of this document is reserved to make observational comments on the behavior on JD Edwards EnterpriseOne on an Oracle RAC 23ai environment. This section covers several Oracle errors that were previously observed in Oracle Database 19c, and those errors are no longer observed in Oracle Database 23ai. The Oracle errors may occur in any one of the many log files associated with JD Edwards EnterpriseOne.

The logs that are specifically targeted in this evaluation effort are the EnterpriseOne Server logs which contain the network and kernel process messages. Logs are further evaluated on the Web tier through the HTML logs, which contain any messages from the user interface as it relates to Oracle database connections. Finally, the Oracle trace and alert logs are evaluated for any Oracle database connection and failover errors that might hinder the Oracle database application continuity with the JD Edwards EnterpriseOne application.

See [Oracle Ensuring Application Continuity](#) for information on Oracle Database Application Continuity.

Oracle Parameter “failover_type”

Oracle Application Continuity (AC) evaluation was performed with a failover_type of NONE. A failover type=NONE as defined by Oracle indicates that no automatic failover mechanism is configured for a particular service or component, particularly in database environments like Oracle. This means that if the primary instance or node providing the service becomes unavailable, there will be no automatic transfer of client connections or application sessions to a secondary or standby instance.

JD Edwards EnterpriseOne supports this default value for failover_type of NONE. The setting to NONE or Application Continuity (AC) is enabled to provide the best assurance for data integrity and avoid Oracle replay and transaction failures in the application where transactions are not idle and may be in an in-flight condition during failover. There is

no guarantee in these situations where `failover_type` is set to `TRANSACTIONAL` or `AUTO` (TAC enabled) that any Oracle database interruptions will result in a completed database transaction.

For JD Edwards EnterpriseOne this is the first step in achieving improved application continuity, first is to support the planned maintenance failover scenario where JD Edwards EnterpriseOne connections are idle which Oracle Database 23ai has made feature enhancements to further support within the JD Edwards EnterpriseOne architecture. The challenges of large JD Edwards EnterpriseOne transaction boundaries and the size of the cache and Oracle replay mechanism are for future efforts.

For information on Oracle High Availability and setting of `failover_type`, see [Oracle High Availability and 'failover_type'](#).

Oracle Parameter “`replay_initiation_timeout`”

One change in the configuration between the Oracle Database 19c and Oracle Database 23ai in the implementation of JD Edwards EnterpriseOne is the Oracle parameter of `'replay_initiation_timeout'`. A replay initiation, as defined by Oracle, is the configuration timeout parameter in Oracle's Application Continuity (AC) feature. It determines the maximum time, in seconds, that a connection must re-establish after a failure before replay is disabled for that request. This timeout ensures that applications don't wait indefinitely for a replay that is unlikely to succeed, preventing excessive resource consumption and allowing the application to fail more gracefully.

For JD Edwards EnterpriseOne the value of `'replay_initiation_timeout'` must be changed to a minimum of 1800. In the testing of several failover conditions, an ORA-25415 “Application Continuity replay initiation timeout exceeded” was observed in the EnterpriseOne Server kernel logs with the Oracle 23ai database. The solution to avoid this error, if encountered, is the increase in the `'replay_initiation_timeout'` variable.

The Oracle parameter of `'replay_initiation_timeout'` is outlined in the [Oracle 23ai Administration and Deployment Guide](#).

Oracle Parameter ‘`drain_timeout`’

Oracle defines the `'drain_timeout'` parameter as a timeout period during which active sessions are allowed to complete their in-flight transactions before a service or instance is shut down or relocated. This parameter is particularly relevant in high-availability environments and during planned maintenance operations.

The default of the Oracle failover parameter for `'drain_timeout'` varies depending on the Oracle infrastructure in which it is deployed. On normal Oracle Cloud Infrastructures (OCI) and On-Premises architectures where `'drain_timeout'` can be manually configured, JD Edwards EnterpriseOne recommends that this setting be configured to 300 or 5 minutes.

Conclusion

Application continuity is an Oracle feature that protects interruptions at the database level for planned and unplanned situations improving the fault tolerance of applications that rely on the Oracle Database. At present, JD Edwards EnterpriseOne continues to support planned maintenance with application continuity.

This document has demonstrated that the improvements in the Oracle Database 23ai have benefited the Oracle database failover window shrinking it to be less than 5 minutes. In the future, cursor and caching improvements within Oracle Database 23ai will continue to work with the JD Edwards EnterpriseOne application to achieve a fully integrated application continuity.

Appendix A – Interactive and Batch Process Description

Appendix A presents the JD Edwards EnterpriseOne interactive and batch processes that were used for application continuity testing. For both interactive and batch process choosing the effective candidate processes used for the comparison is important. The interactive processes listed in Table A1 and batch processes in Table A2 were selected for their wide use for manufacturing in the JD Edwards EnterpriseOne application.

EnterpriseOne Interactive Processes

JD Edwards EnterpriseOne interactive applications are user interfaces within the ERP software that enable users to directly input and manipulate data through a graphical user interface that interacts with the EnterpriseOne system.

Table A1. EnterpriseOne Interactive Processes

Application Process	Description
L42101E	Sales Order Entry
L4310E	Purchase Order Entry
L3411AE	MRP Messaging
L31114U	Work Order Completion

Table A1 lists the interactive applications that were included as a part of the application continuity testing. The four interactive processes cover the ERP module of Supply Chain Management (SCM), one of the most used modules in the JD Edwards EnterpriseOne application suite.

EnterpriseOne Batch Processes

In JD Edwards EnterpriseOne, batch processes are automated, high-volume tasks that run without user interaction at scheduled intervals.

Table A2. EnterpriseOne Batch Processes

Batch Process	Version
R31410	XJDE0001
R3483	ZJDE0004
R42565	XJDE0001
R43500	XJDE0001

Table A2 lists the different batch applications that were included as a part of testing mentioned in this document. The four batch processes used for application continuity evaluation are also part of the ERP module of Supply Chain Management (SCM).

Appendix B – Application Continuity Configuration

The JD Edwards EnterpriseOne components that were configured in the architecture for the testing process discussed in this document are:

The JD Edwards EnterpriseOne components were implemented on Oracle Cloud Infrastructure as a standard VM.

JD Edwards EnterpriseOne Enterprise Server:

- Oracle Linux Server 8.10
- Oracle Database 23ai (23.5.0.24.07) client

Database Server:

- Oracle Linux Server 8.8
- Oracle Database 23ai
Oracle Database 23ai EE Extreme Perf Release 23.0.0.0.0 - Version 23.7.0.25.01

HTML Server

- Oracle Linux Server 8.10
- WebLogic Server 14.1 (14.1.1.0.0); Java JDK (1.8.0_431-b10)

Deployment Server:

- Windows Server 2022 Standard
- VM Standard 2.4 with 4 OCPUs
- 4 OCPUs x Intel Xeon Platinum 8167M CPU @ 2.00 GHz
- 60 GB RAM

Server Manager Console:

- Oracle Linux Server 8.10

Test Controller:

- Windows Server 2022 Standard
- VM Standard 2.4 with 4 OCPUs
- 4 OCPUs x Intel(R) Xeon(R) Platinum 8167M CPU @ 2.00GHz
- 60 GB RAM
- Apache JMeter 5.1.1.r1855137

Software:

- JD Edwards EnterpriseOne Application 9.2 Update 4 with Tools Release 9.2.26.0.

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