Oracle® Machine Learning for R

Release Notes

Release 1.5.1

E97850-07

November 2020

Oracle Machine Learning for R 1.5.1 Release Notes

These release notes contain important information about Release 1.5.1 of OML4R.

Oracle is rebranding the suite of products and components that support machine learning with Oracle Database and Big Data. This technology is now known as Oracle Machine Learning (OML).

The OML application programming interface for R, previously under the name Oracle R Enterprise, is now named Oracle Machine Learning for R (OML4R). The package, class, and function names are not rebranded. They remain `ORE`, `OREbase`, `ore.frame`, `ore.connect`, and so on.

The OML application programming interfaces for SQL include PL/SQL packages, SQL functions, and data dictionary views. Using these APIs is described in publications, previously under the name Oracle Data Mining, that are now named Oracle Machine Learning for SQL (OML4SQL). The PL/SQL package and database view names are not rebranded. They remain `DBMS_DATA_MINING`, `ALL_MINING_MODELS`, and so on.

- New Features in Oracle Machine Learning for R 1.5.1
  OML4R 1.5.1 has some new features that are compatible with Oracle Database Release 18c and later, some that are compatible with Oracle Database Release 12.2.0.1 and later, and others that compatible with Oracle Database Release 12.1.0.2 and earlier.
- Oracle Machine Learning for R 1.5.1 Platform and Configuration Requirements
  OML4R runs on 64-bit platforms only.
- Bugs Fixed in Oracle Machine Learning for R 1.5.1
  OML4R 1.5.1 fixes the problems listed in this topic.
- Documentation Accessibility

New Features in Oracle Machine Learning for R 1.5.1

OML4R 1.5.1 has some new features that are compatible with Oracle Database Release 18c and later, some that are compatible with Oracle Database Release

12.2.0.1 and later, and others that compatible with Oracle Database Release 12.1.0.2 and earlier.

Support for R-3.6.1

R-3.6.1 is compatible with any of the supported Oracle Database releases.

OML4R 1.5.1 requires R-3.3.0 or R-3.6.1. As with earlier releases of OML4R, Oracle recommends that you use Oracle R Distribution.

> **Note:**
>
> R-3.6.1 has an OML4R 1.5.1 binary built under R-3.6.1 and is not compatible with the OML4R 1.5.1 built under R-3.3.0.

- New Features for Oracle Database Release 18c and Later
  Describes the new features in Oracle Machine Learning for R for Oracle Database Release 18c and later releases.
- New Features for Oracle Database Release 12.2.0.1
  Oracle Machine Learning for R 1.5.1 has new functions in the OML4R package `OREdm` and has new arguments for some other functions.
- New Features for Oracle Database Release 12.1.0.2
  Oracle Machine Learning for R 1.5.1 has the new `OREdplyr` package, improved performance of row ordering in `ore.frame` objects, and faster loading of the OML4R packages.
- Other Changes
  Oracle Machine Learning for R Release 1.5.1 has the following other changes, which are in effect for Oracle Database 12*c* Release 12.2.0.1 and earlier releases.

New Features for Oracle Database Release 18c and Later

Describes the new features in Oracle Machine Learning for R for Oracle Database Release 18c and later releases.

The new features in OML4R are the following:

- The `rqcfg.sql` Oracle Machine Learning for R Server installation script. Beginning with Oracle Database 18c, the OML4R Server installation script `rqcfg.sql` replaces the `server` installation script. The `rqcfg.sql` script is part of Oracle Database.
- Compatibility with Oracle Database Release 20c.
- Linux 8 support.
- Updated supporting packages. The supporting packages contain newer versions of some of the packages. Linux 8 requires a different bundle of supporting packages than that used by earlier Linux releases.

New Features for Oracle Database Release 12.2.0.1

Oracle Machine Learning for R 1.5.1 has new functions in the OML4R package `OREdm` and has new arguments for some other functions.

New Functions in the OREdm Package

New functions in the `OREdm` OML4SQL package that use in-database algorithms are the following:

- `ore.odmEM`, Expectation Maximization models
- `ore.odmESA`, Explicit Semantic Analysis models
- `ore.odmRAlg`, Extensible R Algorithm models
- `ore.odmSVD`, Singular Value Decomposition models

The `ore.odmRAlg` enables users to use registered R scripts to create models that use the OML4SQL in-database model framework.

Other new functions are the following:

- `partitions`, which returns partition names from a partitioned model
- `settings`, which returns the OML4SQL parameter settings used to build the model.

New Arguments to Some Functions for OML4SQL Model Build Configuration and Text Processing

The new arguments for some of the machine learning model functions are:

- `odm.setting`
- `ctx.setting`

`odm.setting`

The `odm.setting` value is a list that specifies OML4SQL parameter settings. Both OML4SQL global and algorithm-specific parameters can be specified to configure the model build. Some new features are enabled through the parameter settings. For example, you can use this argument to specify the creation of a partitioned model, which is an ensemble model that consists of multiple sub-models. When you specify the parameter `ODMS_PARTITION_COLUMNS` and the names of the columns by which to partition the input data, the function returns a model with a sub-model for each partition. The partitions are based on the unique values found in the columns.

Partitioned models can automate scoring by allowing you to reference the top-level model only, which causes the proper sub-model to be chosen based on the values of the partitioned column or columns for each row of data to be scored.

`ctx.setting`

With this argument, you can specify Oracle Text attribute-specific settings. You specify the columns that should be treated as text and the type of text transformation to apply.

This argument applies to the following functions:

- `ore.odmESA`, Explicit Semantic Analysis
- `ore.odmGLM`, Generalized Linear Models
- `ore.odmKMeans`, *k*-Means
- `ore.odmNMF`, Non-Negative Matrix Factorization
- `ore.odmSVD`, Singular Value Decomposition
- `ore.odmSVM`, Support Vector Machines

> **Note:**
>
> To create an Oracle Text policy, the user must have the `CTXSYS.CTX_DDL` privilege.

New Features for Oracle Database Release 12.1.0.2

Oracle Machine Learning for R 1.5.1 has the new `OREdplyr` package, improved performance of row ordering in `ore.frame` objects, and faster loading of the OML4R packages.

OREdplyr Package for Data Manipulation

The `dplyr` package provides a grammar of data manipulation functions for `data.frame` objects and `numeric` objects. The new `OREdplyr` package implements much of this functionality for `ore.frame` and `ore.numeric` objects. This enables in-database execution of `dplyr` functionality such as selecting, filtering, ordering, and grouping columns and rows, and joining, summarizing, sampling, and ranking rows.

Related Topics

- Data Manipulation Using OREdplyr

Other Changes

Oracle Machine Learning for R Release 1.5.1 has the following other changes, which are in effect for Oracle Database 12*c* Release 12.2.0.1 and earlier releases.

- Updated supporting packages `DBI` and `ROracle`
- Requirement for R 3.3.0; as with earlier releases of OML4R, Oracle recommends that you use Oracle R Distribution
- A new RPM for Oracle R Distribution, R-core-extra-3.3.0-1.el6.x86_64.rpm

R-3.3.0 depends on newer versions of several third party compression libraries and no longer contains bundled copies of them. This means that R 3.3.0 won't build against

Linux 6 as is, because the native versions of these libraries are older than those that R-3.3.0 requires.

The R-core-extra RPM contains the required versions of these libraries and is provided as a convenience for users of Oracle Linux 6. Adding the location of the libraries in R-core-extra to `LD_LIBRARY_PATH` removes the need to built these libraries separately. Oracle Linux 7 introduces the required versions of these libraries, but the R-core-extra RPM is provided as a convenience if needed.

> **See Also:**
>
> For information on installing Oracle R Distribution using RPMs, see Installing Oracle R Distribution on Linux in *Oracle Machine Learning for R Installation and Administration Guide*

Oracle Machine Learning for R 1.5.1 Platform and Configuration Requirements

OML4R runs on 64-bit platforms only.

Both client and server components are supported on each of the platforms described in this topic.

Table 1-1 Oracle Machine Learning for R Platform Requirements

Operating System	Hardware Platform	Description
Linux x86-64	Intel and AMD	• 64-bit Oracle Linux Releases 6, 7, and 8 • 64-bit Red Hat Enterprise Linux Releases 6 and 7

> **Note:**
>
> Starting with R-3.6.1, Linux 6 is no longer supported.

Oracle Linux may be running on Oracle Exadata Database Machine.

Table 1-1 (Cont.) Oracle Machine Learning for R Platform Requirements

Operating System	Hardware Platform	Description
Oracle Solaris on x86-64 (64-Bit) Oracle Solaris on SPARC-64 (64-Bit)	Intel and SPARC	• 64-bit Oracle Solaris 10 update 11 through Oracle Solaris 11 for both SPARC and x86-64 (Intel) platforms • Oracle SPARC SuperCluster • Oracle Solaris Studio (formerly Sun Studio) 12u3 or later Oracle Solaris may be running on Oracle Exadata Database Machine.
IBM AIX on POWER Systems (64-Bit)	IBM	64-bit IBM AIX 5.3 or higher
Microsoft Windows x64 (64-Bit)	Intel	64-bit Microsoft Windows Professional

Table 1-2 Oracle Machine Learning for R Configuration Requirements and Server Support Matrix

OML4R Version	Open Source R or Oracle R Distribution	Oracle Database Release
1.5.1	3.3.0, 3.6.1	11.2.0.4, 12.1.0.1, 12.1.0.2, 12.2.0.1, 18c, 19c
1.5	3.2.0	11.2.0.4, 12.1.0.1, 12.1.0.2
1.4.1	3.0.1, 3.1.1	11.2.0.3, 11.2.0.4, 12.1.0.1, 12.1.0.2
1.4	2.15.2, 2.15.3, 3.0.1	11.2.0.3, 11.2.0.4, 12.1.0.1
1.3.1	2.15.1, 2.15.2, 2.15.3	11.2.0.3, 11.2.0.4, 12.1.0.1
1.3	2.15.1	11.2.0.3, 11.2.0.4, 12.1.0.1
1.2	2.15.1	11.2.0.3, 11.2.0.4, 12.1.0.1
1.1	2.13.2	11.2.0.3, 11.2.0.4, 12.1.0.1
1.0	2.13.2	11.2.0.3, 11.2.0.4, 12.1.0.1

Note:

In Oracle Database Release 12.1.0.2, for some embedded R operations to be successful, Oracle R Enterprise releases 1.4.1 and later require the database patch -- 20173897 WRONG RESULT OF GROUP BY FROM A TABLE RETURNED BY EXTPROC (Patch).

Bugs Fixed in Oracle Machine Learning for R 1.5.1

OML4R 1.5.1 fixes the problems listed in this topic.

Table 1-3 Bugs Fixed in OML4R 1.5.1

Number	Description
18561846	ORE.PUSH: MIXING R AND ORE OBJECT NAMES CAN RESULT IN REMOVAL OF TEMP TABLE
21901178	VIEW CREATED BY ORE.CREATE ON ORE.FRAME DOES NOT PRESERVE IN MULTIPLE SESSION
22198902	ORE.STEPWISE RETURNS RESIDUALS AS 0 AND NO P-VALUES
22283078	ORE.DROP INCORRECTLY HANDLES VIEWS
22607954	DB TABLES WITH SPECIAL CHARACTER IS NOT ACCESSIBLE IN ORE
23512913	ORE.RANDOMFOREST DOES NOT ACCEPT SINGLE INDEPENDENT VARIABLE
25417402	STEPWISE DEMO FAILS INTERMITTENTLY

Documentation Accessibility

For information about Oracle's commitment to accessibility, visit the Oracle Accessibility Program website at http://www.oracle.com/pls/topic/lookup?ctx=acc&id=docacc.

Access to Oracle Support

Oracle customers that have purchased support have access to electronic support through My Oracle Support. For information, visit http://www.oracle.com/pls/topic/lookup?ctx=acc&id=info or visit http://www.oracle.com/pls/topic/lookup?ctx=acc&id=trs if you are hearing impaired.

Oracle® Machine Learning for R Release Notes, Release 1.5.1
E97850-07

Copyright © 2012, 2020, Oracle and/or its affiliates.

This software and related documentation are provided under a license agreement containing restrictions on use and disclosure and are protected by intellectual property laws. Except as expressly permitted in your license agreement or allowed by law, you may not use, copy, reproduce, translate, broadcast, modify, license, transmit, distribute, exhibit, perform, publish, or display any part, in any form, or by any means. Reverse engineering, disassembly, or decompilation of this software, unless required by law for interoperability, is prohibited.

The information contained herein is subject to change without notice and is not warranted to be error-free. If you find any errors, please report them to us in writing.

If this is software or related documentation that is delivered to the U.S. Government or anyone licensing it on behalf of the U.S. Government, then the following notice is applicable:

U.S. GOVERNMENT END USERS: Oracle programs (including any operating system, integrated software, any programs embedded, installed or activated on delivered hardware, and modifications of such programs) and Oracle computer documentation or other Oracle data delivered to or accessed by U.S. Government end users are "commercial computer software" or "commercial computer software documentation" pursuant to the applicable Federal Acquisition Regulation and agency-specific supplemental regulations. As such, the use, reproduction, duplication, release, display, disclosure, modification, preparation of derivative works, and/or adaptation of i) Oracle programs (including any operating system, integrated software, any programs embedded, installed or activated on delivered hardware, and modifications of such programs), ii) Oracle computer documentation and/or iii) other Oracle data, is subject to the rights and limitations specified in the license contained in the applicable contract. The terms governing the U.S. Government's use of Oracle cloud services are defined by the applicable contract for such services. No other rights are granted to the U.S. Government.

This software or hardware is developed for general use in a variety of information management applications. It is not developed or intended for use in any inherently dangerous applications, including applications that may create a risk of personal injury. If you use this software or hardware in dangerous applications, then you shall be responsible to take all appropriate fail-safe, backup, redundancy, and other measures to ensure its safe use. Oracle Corporation and its affiliates disclaim any liability for any damages caused by use of this software or hardware in dangerous applications.

Oracle and Java are registered trademarks of Oracle and/or its affiliates. Other names may be trademarks of their respective owners.

Intel and Intel Inside are trademarks or registered trademarks of Intel Corporation. All SPARC trademarks are used under license and are trademarks or registered trademarks of SPARC International, Inc. AMD, Epyc, and the AMD logo are trademarks or registered trademarks of Advanced Micro Devices. UNIX is a registered trademark of The Open Group.

This software or hardware and documentation may provide access to or information about content, products, and services from third parties. Oracle Corporation and its affiliates are not responsible for and expressly disclaim all warranties of any kind with respect to third-party content, products, and services unless otherwise set forth in an applicable agreement between you and Oracle. Oracle Corporation and its affiliates will not be responsible for any loss, costs, or damages incurred due to your access to or use of third-party content, products, or services, except as set forth in an applicable agreement between you and Oracle.