Trivadis Markdown Doc Template

A template for markdown based documentation

Stefan Oehrli

Table of Contents

[2 Preface 3](#_Toc97626656)

[2.1 About Trivadis Markdown Doc Template 3](#_Toc97626657)

[2.2 Copyright and Disclaimer 3](#_Toc97626658)

[2.3 Document information 3](#_Toc97626659)

[2.4 Revision History 3](#_Toc97626660)

[3 Management Summary 4](#_Toc97626661)

[4 Introduction 5](#_Toc97626662)

[4.1 Overview 5](#_Toc97626663)

[4.2 Goals 5](#_Toc97626664)

[4.3 Scope 5](#_Toc97626665)

[4.4 Document Conventions 5](#_Toc97626666)

[5 Author and Release Guide 7](#_Toc97626667)

[5.1 Document Structure 7](#_Toc97626668)

[5.1.1 Folders 7](#_Toc97626669)

[5.1.2 Markdown Files 7](#_Toc97626670)

[5.1.3 Document Metadata 8](#_Toc97626671)

[5.2 Additional Language 9](#_Toc97626672)

[5.3 Releases and Versions 9](#_Toc97626673)

[5.3.1 Release and Version Numbering 9](#_Toc97626674)

[5.3.2 Create a Release 9](#_Toc97626675)

[5.4 Creating a new Markdown documentation 10](#_Toc97626676)

[5.5 Build Documentation 10](#_Toc97626677)

[5.5.1 Automatic Build Workflow 10](#_Toc97626678)

[5.5.2 Manual Build 10](#_Toc97626679)

[5.6 Further Topics 11](#_Toc97626680)

[6 Formatting Examples 13](#_Toc97626681)

[6.1 Basic Syntax 13](#_Toc97626682)

[6.1.1 Heading 13](#_Toc97626683)

[6.1.2 Emphasis 13](#_Toc97626684)

[6.1.3 Blockquote 13](#_Toc97626685)

[6.1.4 Ordered List 13](#_Toc97626686)

[6.1.5 Unordered List 13](#_Toc97626687)

[6.1.6 Code 13](#_Toc97626688)

[6.1.7 Horizontal Rule 14](#_Toc97626689)

[6.1.8 Link 14](#_Toc97626690)

[6.1.9 Image 14](#_Toc97626691)

[6.2 Extended Syntax 14](#_Toc97626692)

[6.2.1 Table 14](#_Toc97626693)

[6.2.2 Fenced Code Block 14](#_Toc97626694)

[6.2.3 Footnote 14](#_Toc97626695)

[6.2.4 Heading ID 15](#_Toc97626696)

[6.2.5 My Great Heading 15](#_Toc97626697)

[6.2.6 Definition List 15](#_Toc97626698)

[6.2.7 Strikethrough 15](#_Toc97626699)

[6.2.8 Task List 15](#_Toc97626700)

[6.3 Box Types 15](#_Toc97626701)

[7 Appendix A: References 17](#_Toc97626702)

[8 Appendix B: Glossary 20](#_Toc97626703)

[9 Appendix C: Scripts 21](#_Toc97626704)

[9.1 Wallet Information V$ENCRYPTION\_WALLET 21](#_Toc97626705)

[9.2 TDE Key Information V$ENCRYPTION\_KEYS 21](#_Toc97626706)

[9.3 Tablespace Information V$ENCRYPTED\_TABLESPACES 23](#_Toc97626707)

[9.4 Container Information CDB\_ENCRYPTED\_COLUMNS 23](#_Toc97626708)

[9.5 Container Information V$CONTAINERS 24](#_Toc97626709)

[9.6 Client Secret Information V$CLIENT\_SECRETS 24](#_Toc97626710)

# Preface

## About Trivadis Markdown Doc Template

Welcome to the Trivadis *Markdown Doc Template*. This template serves as a basis for Markdown based documentation. Feel free to use it in our project.

## Copyright and Disclaimer

All terms that are known trademarks or service marks have been capitalized. All trademarks are the property of their respective owners.

The authors and publisher shall have neither liability nor responsibility to any person or entity with respect to the loss or damages arising from the information contained in this work. This work may include inaccuracies or typographical errors and solely represent the opinions of the authors. Changes are periodically made to this document without notice. The authors reserve the right to revise this document at any time without notice.

## Document information

* **Document:** Oracle Transparent Data Encryption 19c
* **Classification:** internal
* **Status:** work in Progress
* **Last changes:** 2021.08.18
* **Document name:** tvddoc-template.pdf

Authors

| * Lead Authors | * Contributors & Reviewers |
| --- | --- |
| * Roland Maile | * Stefan Oehrli |

## Revision History

| * Version | * Date | * Visa | * Comment |
| --- | --- | --- | --- |
| * 0.0.1 | * 2021.06.01 | * rma | * Creation |
| * 0.0.2 | * 2021.08.17 | * rma | * Review Document, Add Hardware Keystore, Performance metrics |
| * 0.0.3 | * 2021.08.18 | * soe | * Convert to Trivadis Markdown Template |

# Management Summary

Various types of technical documentation are created at Trivadis. This includes documentation of technical assesments, concepts, installation and operation manuals and many more. These documents often include a lot of code blocks, graphics, tables etc. Adhering to the corporate identity and implementing unified formatting is usually time-consuming and cumbersome. Depending on the project, there are also different requirements for what target formats are to be created i.e. Word documents, PDF etc.

This documentation or Markdown template serves as a basis for Markdown-based documentation. With the help of corresponding reference documents, *TeX* templates and *pandoc*, the various target documents can be created automatically. The source remains text files with Markdown, which can be versioned relatively easily with GIT.

It contains:

* Meta information about the document
* Document structure
* Various format examples
* Examples for appendices

# Introduction

Add a short introduction to the *Good Practice* guide.

## Overview

Creating documentation is one of the regular activities of a consultant. Whether it is the creation of simple notes to log the work at the customer site or the creation of extensive documentation such as concepts, infrastructure assessments, security reviews or installation and operation manuals. The focus of these documents is primarily on the content. Nevertheless, these documents represent Trivadis and its products, services and employees to the outside world.

For these reasons, it is important that technical documents also fit in with Trivadis’ corporate identity. The use of different templates, some of which are old or incomplete, makes it impossible to achieve this goal. Also the use of different tools for documentation does not make it easier at all. The use of Markdown as the basis for the documentation allows the focus on the content as well as the easy use of a version control like GIT. The documents can then be converted to a number of different formats using Pandoc, including DOCX, PDF, ePUB, HTML and more.

## Goals

This documentation serves as a Markdown template. In addition to the document structure, various formatting examples are shown. Furthermore, this document is used for the verification of the Trivadis templates with *Pandoc*.

## Scope

This documentation describes the *Trivadis Markdown Doc Template* and the process for automated generation of Trivadis documents. This includes examples of formatting, explanation of templates, and easy use of *Pandoc*.

In particular, the following objectives are to be achieved:

* Demonstrate how to create technical documentation using Markdown
* Author’s guide for technical documentation
* Document structure and formatting examples
* Example document for the verification of the different Trivadis templates in connection with *Pandoc*.

## Document Conventions

The following typographical conventions are used throughout this documentation:

Document Conventions

| * Convention | * Meaning |
| --- | --- |
| * **boldface** | * Boldface type indicates graphical user interface elements associated with an action, or terms defined in text or the glossary. |
| * *italic* | * Italic type indicates book titles, product names, emphasis, or placeholder variables for which you supply particular values. |
| * monospace | * Used for blocks of code, inline code, commands, and script examples. Text should be interpreted exactly as presented. |

# Author and Release Guide

## Document Structure

### Folders

This repository contains a couple of default folders. The language specific folders are only a suggestion and have to be adapted or deleted accordingly. If you add or remove language folders you also have to adjust the Azure DevOps pipeline. [Doc Build](.build/doc-pipeline.yml)

* <en> English documentation files.
* <images> Images and logo files.

The following Markdown files are generic files describing the repository, authoring, contributing etc. They are not related to the good practice nor will they be used to build the good practice documentation.

* [AUTHOR\_GUIDE](AUTHOR_GUIDE.md) General author’s guide to *Trivadis Markdown Doc Template*. This has to be adapted to the corresponding guideline.
* [CHANGELOG](CHANGELOG.md) Change log for the *Trivadis Markdown Doc Template*.
* <LICENSE> License for this template.
* <VERSION> file to store the version number.

### Markdown Files

#### General Information

Each language of the *Trivadis Markdown Doc Template* includes a bunch of *Markdown* files. These files do follow a naming pattern NxMM-Title.md where N and MM stands for the following:

* **N** Digit for the main chapter number.
* **M** Two digit for sorting the files within a main chapter.
* **Title** Just a title to name the file. Should be related to the content.

*It is cructial* to keep the prefix, as this is used to sort the Markdown files during the document build process. Files with no or an other prefix will be ignored during documentation build.

| * Prefix | * Chapter |
| --- | --- |
| * 0x.. | * Preface, Revision History and other general doc information |
| * 1x.. | * Introduction, management summary, scope, etc. |
| * 2x.. | * Chapter 1 will be TOC number 3 |
| * Nx.. | * Good practice chapter N will be TOC number N+2 |
| * 9x.. | * Appendix files |

You can add as much files as you want. The prefix itself is not relevant for for the TOC itself. Pandoc will create the TOC based on the headings within the Markdown files. e.g. # will create a top level heading.

#### Markdown Syntax

You will find plenty of Markdown references and cheat sheets online e.g. [/Markdown-Cheatsheet](https://github.com/adam-p/markdown-here/wiki/Markdown-Cheatsheet)

Just be aware, that the Markdown syntax is checked by a Pipeline based on markdownlint-cli (see [markdownlint](https://github.com/DavidAnson/markdownlint), [markdownlint-cli](https://github.com/igorshubovych/markdownlint-cli) or [DavidAnson/markdownlint](https://hub.docker.com/r/06kellyjac/markdownlint-cli)). Any violation of the [rules](https://github.com/DavidAnson/markdownlint/blob/main/doc/Rules.md) will result in an error. You either have to fix the error or add an exception to the rule. The exception has to be added to each file or alternatively in the global configuration <.markdownlint.json>.

A few examples for embedded exceptions:

* Ignore rule MD013 / line length for tables

<!-- markdownlint-configure-file { "MD013": { "tables": false } } -->

* Ignore rule MD013 / line length completely in this file

<!-- markdownlint-disable MD013 -->

* Ignore rule MD024 / Multiple headings with the same content

<!-- markdownlint-configure-file { "MD024": { "allow\_different\_nesting": true } } -->

An example for a global exception:

{  
 "default": true,  
 "MD003": { "style": "atx\_closed" },  
 "MD007": { "indent": 4 },  
 "no-hard-tabs": false,  
 "whitespace": false  
}

It is recommended to add a Markdown Lint to you favorite editor like *Visual Studio Code* and the Markdownlint by David Anson.

The latest release does support boxes in PDF generation. See [1x10-General\_Information](en/1x10-General_Information.md) for an example.

::: note  
\*\*Note\*\* Lorem ipsum dolor ...  
:::

### Document Metadata

Pandoc document conversion can be configured / customized using metadata either as a metadata block in the Markdown file itself or in a dedicated [YAML](https://yaml.org/spec/1.2/spec.html) file. See also the [pandoc documentation](https://pandoc.org/MANUAL.html). The workflow in this repository is configured to use a dedicated metafile for each language. The file is named metadata.yml and located in the corresponding directory (e.g. <en/metadata.yml>)

It is strongly recommended to adjust the metadata according to the requirement of the respective *documentation*.

## Additional Language

This template does have one folders per languages english <en>. If necessary, this directory can be copied to add another language. The language abbreviation is used as the directory name. e.g. fr, de, en etc. In order for the documents to be created for an additional language, the Azure DevOps pipeline *Doc Build* must be adapted. For the new language, corresponding steps must be available or corresponding job must be removed. The Azure DevOps pipeline *Doc Build* is available in [doc-pipeline.yml](.build/doc-pipeline.yml).

As an example, the step the German PDF documentation:

# Build PDF documentation using oehrlis/pandoc container  
 - script: |  
 DOC\_LANG="de"  
 DOC\_NAME="${BUILD\_REPOSITORY\_NAME}\_${DOC\_LANG}"  
 docker run --rm -v "$PWD":/workdir:z oehrlis/pandoc \  
 --metadata-file=${DOC\_LANG}/metadata.yml \  
 --listings --pdf-engine=xelatex \  
 --resource-path=images --filter pandoc-latex-environment \  
 --output=${DOC\_NAME}.pdf ${DOC\_LANG}/?x??-\*.md  
 displayName: 'Build PDF documentation'

As you can see you only have to adapt the language variable DOC\_LANG=de.

## Releases and Versions

### Release and Version Numbering

You find all official releases and release information on the Azure DevOps project release page. As well documented in the [CHANGELOG](CHANGELOG.md).

The versioning and release tags follow the [semantic versioning](https://semver.org/). A version number is specified by *MAJOR.MINOR.PATCH*, increase the:

* *MAJOR* version when you make incompatible API changes,
* *MINOR* version when you add functionality in a backwards compatible manner, AND
* *PATCH* version when you make backwards compatible bug fixes.

Additional labels for pre-release and build metadata are available as extensions to the MAJOR.MINOR.PATCH format.

### Create a Release

New releases currently have to be build via GitHub release. Each release require a short release note. Procedure:

* Update / Commit changes
* Update the [CHANGELOG](CHANGELOG.md) add the latest change information
* Create an new release
* Add release information based on changes e.g. git log --pretty=format:%s v0.1.0...HEAD

## Creating a new *Markdown* documentation

This GIT repository is defined as a template and can be used in a new repository. Just copy the corresponding files / folders in you GIT repository.

* Add the files to your GIT repository
* Add or remove language folders
* Update the README files and links
* Add the Azure DevOps pipeline using the file <.build/doc-pipeline.yml>

## Build Documentation

### Automatic Build Workflow

The Azure DevOps GIT repository does have a pipeline with several jobs defined.

| * File | * Workflow Name | * Purpose |
| --- | --- | --- |
| * [doc-pipeline.yml](./.build/doc-pipeline.yml) | * Doc Build | * Workflow with different jobs to build and publish the documents. |

The workflow do trigger on any *push* and *pull-request* on the main branch. If necessary it can also be triggered manually via Azure DevOps.

### Manual Build

#### Docker Container

Creating the documents with the help of pandoc container [oehrlis/pandoc](https://github.com/oehrlis/pandoc_template) is the most convenient method. Apart from having Docker installed, there are no other dependencies. The container xxx contains all the necessary components like pandoc, TeX, fonts, templates, etc.

* Generate a PDF document with support for awesome boxes

docker run --rm -v "$PWD":/workdir:z oehrlis/pandoc \  
--metadata-file=en/metadata.yml \  
--listings --pdf-engine=xelatex \  
--resource-path=images --filter pandoc-latex-environment \  
--output=tvd-good-practice-template\_en.pdf en/?x??-\*.md

* Generate a PDF document without support boxes

docker run --rm -v "$PWD":/workdir:z oehrlis/pandoc \  
--metadata-file=en/metadata.yml \  
--listings --pdf-engine=xelatex \  
--resource-path=images \  
--output=tvd-good-practice-template\_en.pdf en/?x??-\*.md

* Generate a DOCX document

docker run --rm -v "$PWD":/workdir:z oehrlis/pandoc \  
--metadata-file=en/metadata.yml \  
--listings --resource-path=images \  
--output=tvd-good-practice-template\_en.docx en/?x??-\*.md

* Generate a PPTX document from Chapter 2-8. This will omit preface, introduction and appendix.

docker run --rm -v "$PWD":/workdir:z oehrlis/pandoc \  
--metadata-file=en/metadata.yml \  
--listings --resource-path=images \  
--output=tvd-good-practice-template\_en.pptx en/[1-8]x??-\*.md

#### Local pandoc Installation

If you do have a local *pandoc* installation including LaTeX, you may also generate the corresponding documents directly using pandoc via command line. But be aware of the necessary requirements. e.g. fonts, LaTeX, templates from [oehrlis/pandoc\_template](https://github.com/oehrlis/pandoc_template) etc.

* Generate a PDF document

pandoc --metadata-file=en/metadata.yml \  
--template=$(pwd)/templates/trivadis.tex \  
--listings --pdf-engine=xelatex \  
--resource-path=images \  
--output=tvd-good-practice-template\_en.pdf en/?x??-\*.md

* Generate a PDF document with support for awesome boxes.

pandoc --metadata-file=en/metadata.yml \  
--template=$(pwd)/templates/trivadis.tex \  
--listings --pdf-engine=xelatex \  
--resource-path=images --filter pandoc-latex-environment \  
--output=tvd-good-practice-template\_en.pdf en/?x??-\*.md

* Generate a DOCX document

pandoc --metadata-file=en/metadata.yml \  
--listings --reference-doc templates/trivadis.docx \  
--resource-path=images \  
--output=tvd-good-practice-template\_en.docx en/?x??-\*.md

* Generate a standalone HTML document

pandoc --metadata-file=en/metadata.yml \  
-s --toc --template=$(pwd)/templates/GitHub.html5 \  
--resource-path=images \  
--output=tvd-good-practice-template\_en.html en/?x??-\*.md

* Generate a EPUB document

pandoc --metadata-file=en/metadata.yml \  
--reference-doc templates/trivadis.epub \  
--resource-path=images \  
--output=tvd-good-practice-template\_en.epub en/?x??-\*.md

## Further Topics

There a couple of additional topics which are not yet implemented or documented. This includes among other the following points.

* Automatic Release Workflow
* Generate additional formates like Word (.docx), eBooks (.epub), Power Point (.pptx), man pages, etc.
* Generate HTML version / Webpage

# Formatting Examples

## Basic Syntax

These are the elements outlined in John Gruber’s original design document. All Markdown applications support these elements.

### Heading

Headings are created with a #. Where the number of # corresponds to the level of the heading.

# This is an <h1> tag  
## This is an <h2> tag  
### This is an <h3> tag

### Emphasis

\*This text will be italic\*  
\_This will also be italic\_  
  
\*\*This text will be bold\*\*  
\_\_This will also be bold\_\_  
  
\_You \*\*can\*\* combine them\_

*This text will be italic* *This will also be italic*

**This text will be bold** **This will also be bold**

*You* ***can*** *combine them*

### Blockquote

> blockquote

blockquote

### Ordered List

1. First item
2. Second item
3. Third item

### Unordered List

* First item
* Second item
* Third item

### Code

code

### Horizontal Rule

### Link

[title](https://www.example.com)

### Image



“Oracle Centrally Managed Users Overview”

## Extended Syntax

These elements extend the basic syntax by adding additional features. Not all Markdown applications support these elements.

### Table

| * Syntax | * Description |
| --- | --- |
| * Header | * Title |
| * Paragraph | * Text |

### Fenced Code Block

{  
 "firstName": "John",  
 "lastName": "Smith",  
 "age": 25  
}

### Footnote

Here’s a sentence with a footnote. [[1]](#footnote-1)

### Heading ID

### My Great Heading

### Definition List

term

definition For a list of all available boxes and options visit theFor a list of all available boxes and options visit theFor a list of all available boxes and options visit the

### Strikethrough

~~The world is flat.~~

### Task List

* ☒ Write the press release
* ☐ Update the website
* ☐ Contact the media

## Box Types

For a list of all available boxes and options visit the [awesomebox documentation](https://ctan.org/pkg/awesomebox).

::: note  
\*\*Note\*\* Lorem ipsum dolor ...  
:::

Lorem ipsum dolor sit amet, consectetur adipiscing elit. Nam aliquet libero quis lectus elementum fermentum.

Fusce aliquet augue sapien, non efficitur mi ornare sed. Morbi at dictum felis. Pellentesque tortor lacus, semper et neque vitae, egestas commodo nisl.

::: tip  
\*\*Tip\*\* Lorem ipsum dolor ...  
:::

**Tip** Lorem ipsum dolor sit amet, consectetur adipiscing elit. Nam aliquet libero quis lectus elementum fermentum.

Fusce aliquet augue sapien, non efficitur mi ornare sed. Morbi at dictum felis. Pellentesque tortor lacus, semper et neque vitae, egestas commodo nisl.

::: warning  
\*\*Warning\*\* Lorem ipsum dolor ...  
:::

**Warning** Lorem ipsum dolor sit amet, consectetur adipiscing elit. Nam aliquet libero quis lectus elementum fermentum.

Fusce aliquet augue sapien, non efficitur mi ornare sed. Morbi at dictum felis. Pellentesque tortor lacus, semper et neque vitae, egestas commodo nisl.

::: warning  
\*\*Caution\*\* Lorem ipsum dolor ...  
:::

**Caution** Lorem ipsum dolor sit amet, consectetur adipiscing elit. Nam aliquet libero quis lectus elementum fermentum.

Fusce aliquet augue sapien, non efficitur mi ornare sed. Morbi at dictum felis. Pellentesque tortor lacus, semper et neque vitae, egestas commodo nisl.

::: important  
\*\*Important\*\* Lorem ipsum dolor ...  
:::

**Important** Lorem ipsum dolor sit amet, consectetur adipiscing elit. Nam aliquet libero quis lectus elementum fermentum.

Fusce aliquet augue sapien, non efficitur mi ornare sed. Morbi at dictum felis. Pellentesque tortor lacus, semper et neque vitae, egestas commodo nisl.

Markdown formatting inside the environments is supported.

**Lorem ipsum dolor** sit amet, consectetur adipiscing elit.

if(args.length < 2) {  
 System.out.println("Lorem ipsum dolor sit amet");  
}

*Nam aliquet libero quis lectus elementum fermentum.*

**Trivadis** Lorem ipsum dolor sit amet, consectetur adipiscing elit. Nam aliquet libero quis lectus elementum fermentum.

Fusce aliquet augue sapien, non efficitur mi ornare sed. Morbi at dictum felis. Pellentesque tortor lacus, semper et neque vitae, egestas commodo nisl.

**Trivadis** Lorem ipsum dolor sit amet, consectetur adipiscing elit. Nam aliquet libero quis lectus elementum fermentum.

Fusce aliquet augue sapien, non efficitur mi ornare sed. Morbi at dictum felis. Pellentesque tortor lacus, semper et neque vitae, egestas commodo nisl.

# Appendix A: References

The purpose of this Markdown file is to provide a references for this *Good Practice* Guide. Feel free to adjust it accordingly or omit / remove the markdown file.

The following references are useful in the context of the Trivadis CPU Report and have been helpful in creating this report.

General information on the Oracle Critical Patch Advisory:

* Oracle Recommended Patches Oracle JavaVM Component Database PSU (OJVM PSU) Patches ([1929745.1](https://support.oracle.com/epmos/faces/DocumentDisplay?id=1929745.1))
* Patch Set Updates Known Issues Notes ([1227443.1](https://support.oracle.com/epmos/faces/DocumentDisplay?id=1227443.1))
* Database Security Patching from 12.1.0.1 onwards ([1581950.1](https://support.oracle.com/epmos/faces/DocumentDisplay?id=1581950.1))
* Quick Reference to Patch Numbers for Database PSU, SPU(CPU), Bundle Patches and Patchsets ([1454618.1](https://support.oracle.com/epmos/faces/DocumentDisplay?id=1454618.1))
* Risk Matrix Glossary – terms and definitions for Critical Patch Update risk matrices ([394486.1](https://support.oracle.com/epmos/faces/DocumentDisplay?id=394486.1))
* Use of Common Vulnerability Scoring System (CVSS) by Oracle ([394487.1](https://support.oracle.com/epmos/faces/DocumentDisplay?id=394487.1))
* Release Schedule of Current Database Releases ([742060.1](https://support.oracle.com/epmos/faces/DocumentDisplay?id=742060.1))

Information about the current Critical Patch Update:

* Official Oracle website for this patch [Oracle Critical Patch Update Advisory - January 2021](https://www.oracle.com/security-alerts/cpujan2021.html)
* Text Form of Oracle Critical Patch Update - [January 2021 Risk Matrices](https://www.oracle.com/security-alerts/cpujan2021verbose.html)
* Oracle Critical Patch Update January 2021 Documentation Map - MOS Note [2739466.1](https://support.oracle.com/epmos/faces/DocumentDisplay?id=2739466.1)
* Critical Patch Update (CPU) Program Jan 2021 Patch Availability Document (PAD) (Doc ID ) [2725756.1](https://support.oracle.com/epmos/faces/DocumentDisplay?id=2725756.1)

Database Security Standards and Best Practice:

* CIS Oracle Database Benchmarks - <https://www.cisecurity.org/benchmark/oracle_database/>
* STIGs Document Library - [Database STIG](https://public.cyber.mil/stigs/downloads/?_dl_facet_stigs=app-security%2Cdatabase)
* Common Vulnerability Scoring System [CVSS](http://www.first.org/cvss/)

[1] Advanced Security Guide, Part I Using Transparent Data Encryption

<https://docs.oracle.com/en/database/oracle/oracle-database/19/asoag/asopart1.html>

[2] Oracle Support: Master Note For Transparent Data Encryption ( TDE ) (Doc ID 1228046.1)

<https://support.oracle.com/epmos/faces/DocumentDisplay?&id=1228046.1>

[3] SafeNet PKCS#11 with Oracle TDE - Integration Guide

<https://cpl.thalesgroup.com/resources/encryption/oracle-tde-pkcs-11-integration-guide>

[4] Oracle Support: Getting Started With Transparent Data Encryption in Oracle 12c (non pluggable database ) (Doc ID 1964158.1)

<https://support.oracle.com/epmos/faces/DocumentDisplay?id=1964158.1>

[5] Oracle Support

<https://support.oracle.com/>

[6] Norman Sibbing | Oracle Blogs

<https://blogs.oracle.com/author/norman-sibbing>

[7] Trivadis training courses and Blogs

<https://www.trivadis.com/en/trainings>

<https://www.trivadis.com/en/trivadis-blogs>

[8] Oracle 19c Articles - ORACLE-BASE

<https://oracle-base.com/articles/19c/articles-19c>

[9] Database Licensing Information User Manual

<https://docs.oracle.com/en/database/oracle/oracle-database/19/dblic/Licensing-Information.html>

[10] Managing Keystores and TDE Master Encryption Keys in United Mode

<https://docs.oracle.com/en/database/oracle/oracle-database/19/asoag/managing-keystores-encryption-keys-in-united-mode.html>

[11] Managing Keystores and TDE Master Encryption Keys in Isolated Mode

<https://docs.oracle.com/en/database/oracle/oracle-database/19/asoag/managing-keystores-encryption-keys-in-isolated-mode.html>

[12] Bug 30398099 - Encrypt\_new\_tablespaces Parameter Should Support More Algorithms (Doc ID 30398099.8)

<https://support.oracle.com/epmos/faces/DocumentDisplay?&id=30398099.8>

[13] Next Generation Enterprise Key Management

<https://cpl.thalesgroup.com/en-gb/encryption/ciphertrust-manager>

[14] How To Verify With A Simple Test If TDE Tablespace Encryption is really encrypting my data? (Doc ID 1495828.1)

<https://support.oracle.com/epmos/faces/DocumentDisplay?&id=1495828.1>

[15] Oracle MAA Architecture White Paper: Converting to Transparent Data Encryption with Oracle Data Guard using Fast Offline ConversionConverting to Transparent Data Encryption with Oracle Data Guard using Fast Offline Conversion

<https://www.oracle.com/technetwork/database/availability/tde-conversion-dg-3045460.pdf>

[16] How to delete old master keys from 12c TDE keystore (wallet). (Doc ID 2216279.1)

<https://support.oracle.com/epmos/faces/DocumentDisplay?&id=2216279.1>

[17] TDE Wallet Problem in 12c: Cannot do a Set Key operation when an auto-login wallet is present (Doc ID 1944507.1)

<https://support.oracle.com/epmos/faces/DocumentDisplay?&id=1944507.1>

[18] HOW TO clone PDB with TDE implemented (Doc ID 2350151.1)

<https://support.oracle.com/epmos/faces/DocumentDisplay?&id=2350151.1>

[19] Does Rman Re-Encrypt TDE (Tablespace) Encrypted Data? (Doc ID 819167.1)

<https://support.oracle.com/epmos/faces/DocumentDisplay?&id=819167.1>

[20] How to Move/Restore DB to New Host and File System using RMAN (Doc ID 1338193.1)

<https://support.oracle.com/epmos/faces/DocumentDisplay?&id=1338193.1>

[21] Introducing SLOB – The Simple Database I/O Testing Toolkit for Oracle Database

<https://kevinclosson.net/2012/02/06/introducing-slob-the-silly-little-oracle-benchmark/>

# Appendix B: Glossary

The purpose of this Markdown file is to provide a glossary for this *Good Practice* Guide. Feel free to adjust it accordingly or omit / remove the markdown file.

* **API** – Application programming interface
* **CA** – Certificate Authority
* **CDB** - Oracle Container Database respectively *cdb$root*
* **CIS** - Center for Internet Security [CIS](https://www.cisecurity.org/)
* **CLI** – Command Line Interface
* **CMU** - Oracle Centrally Managed Users see [CMU](https://docs.oracle.com/en/database/oracle/oracle-database/21/dbseg/integrating_mads_with_oracle_database.html)
* **CPU** - Oracle Critical Patch Update see [CPU](https://www.oracle.com/security-alerts/)
* **CVSS** - Common Vulnerability Scoring System [CVSS](http://www.first.org/cvss)
* **DBaaS** - Database as a Service
* **EUS** - Oracle Enterprise User Security see [EUS](https://docs.oracle.com/en/database/oracle/oracle-database/21/dbimi/index.html)
* **IAM** - Identity and Access Management
* **JDBC** - Java Database Connectivity is an application programming interface (API) for the programming language Java, which defines how a client may access a database.
* **KDC** - A key distribution center (KDC) is a component in an access control system responsible for servicing user requests to access resources by supplying access tickets and session keys
* **KRB** - [Kerberos](https://web.mit.edu/kerberos) The Network Authentication Protocol
* **LDAP** – Lightweight Directory Access Protocol
* **MIT** - Massachusetts Institute of Technology [MIT](https://www.mit.edu/)
* **MODS** - Managed Oracle Database Service
* **OUD** - Oracle Unified Directory
* **PDB** - Pluggable Database
* **PoC** - Proof of Concept see [PoC](https://en.wikipedia.org/wiki/Proof_of_concept)
* **PSU** - Patch Set Update
* **RAC** - Oracle Real Appliction Cluster
* **RBAC** – Role-Based Access Control
* **RDP** – Remote Desktop Protocol
* **RU** - Release Update
* **SPN** - A service principal name (SPN) is a unique identifier of a service instance.
* **SPU** - Security Patch Update
* **SSH** – Secure Shell see [ssh](https://en.wikipedia.org/wiki/Secure_Shell_Protocol)
* **SSL** – Secure Sockets Layer see [SSL](https://en.wikipedia.org/wiki/Transport_Layer_Security)
* **SSO** – Single Sign-On see [SSO](https://en.wikipedia.org/wiki/Single_sign-on)
* **TGS** - Ticket Granting Server (TGS) is a logical key distribution center (KDC) component that is used by the Kerberos protocol as a trusted third party.
* **TGT** - Ticket Granting Ticket (TGT) is a user authentication token issued by the Key Distribution Center (KDC) that is used to request access tokens from the Ticket Granting Service (TGS) for specific resources/systems joined to the domain.
* **TLS** – Transport Layer Security, the successor to Secure Sockets Layer (see [SSL](https://en.wikipedia.org/wiki/Transport_Layer_Security))

# Appendix C: Scripts

The scripts listed below are used to query the Oracle data dictionary regrading TDE information.

## Wallet Information *V$ENCRYPTION\_WALLET*

Information about the encryption wallet.

PROMPT V$ENCRYPTION\_WALLET  
  
set linesize window  
COL WRL\_TYPE FOR A10  
COL STATUS FOR A20  
COL WRL\_PARAMETER FOR A33  
COL WALLET\_TYPE FOR A15  
COL PDB\_NAME FOR A15  
  
SELECT   
 b.name AS pdb\_name,   
 wrl\_type,   
 keystore\_mode,   
 open\_mode,  
 wrl\_parameter,   
 wallet\_type,  
 status   
FROM   
 v$encryption\_wallet a,   
 v$containers b  
WHERE   
 a.con\_id=b.con\_id;

## TDE Key Information *V$ENCRYPTION\_KEYS*

Information about the encryption keys.

PROMPT V$ENCRYPTION\_KEYS  
set linesize window  
COL KEY\_ID FOR A52  
COL ACTIVATION\_TIME FOR A17  
COL NAME FOR A15  
COL TAG FOR A30  
SELECT   
 b.name,  
 a.key\_id,  
 trunc (a.activation\_time) AS activation\_time,  
 tag  
FROM   
 v$encryption\_keys a,  
 v$containers b  
WHERE  
 a.con\_id=b.con\_id;

Information about the encryption keys.

set linesize window  
COL creator FOR A5  
COL key\_use FOR A10  
COL keystore\_type FOR A25  
COL origin FOR A10  
COL creator\_pdbname FOR A15  
COL activating\_pdbname FOR A15  
COL KEY\_ID... FOR A10  
SELECT  
 b.name,  
 substr(key\_id,1,6)||'...' "KEY\_ID...",  
 creator,  
 key\_use,  
 keystore\_type,  
 origin,  
 creator\_pdbname,  
 activating\_pdbname   
from   
 v$encryption\_keys a ,v$containers b  
WHERE  
 a.con\_id=b.con\_id;

Information about the encryption keys.

set lines window  
COL name FOR A10  
COL key\_id FOR A60  
COL creation\_time FOR A40  
SELECT   
 p.name,  
 p.open\_mode,  
 ek.key\_id,  
 ek.creation\_time,  
 ek.key\_use  
FROM  
 v$pdbs p LEFT OUTER JOIN v$encryption\_keys ek ON (ek.con\_id = p.con\_id)   
ORDER BY   
 p.con\_id;

Information about the encryption keys.

PROMPT V$DATABASE\_KEY\_INFO  
SET linesize window  
COL NAME FOR A10  
COL KEY\_ID FOR A50  
COL active FOR A10  
SELECT  
 b.name,   
 encryptionalg,  
 masterkeyid,  
 masterkey\_activated AS active   
FROM  
 v$database\_key\_info a ,v$containers b   
WHERE   
 a.con\_id=b.con\_id;

## Tablespace Information *V$ENCRYPTED\_TABLESPACES*

PROMPT v$encrypted\_tablespaces  
SET linesize window  
COL pdb\_name FOR A10  
COL tbs\_name FOR A15  
SELECT   
 c.name pdb\_name,  
 b.name tbs\_name,  
 a.encryptionalg,  
 a.encryptedkey,  
 a.masterkeyid,  
 a.status  
FROM   
 v$encrypted\_tablespaces a,  
 v$tablespace b,  
 v$containers c  
WHERE  
 b.ts#=a.ts# AND   
 a.con\_id=c.con\_id AND   
 b.con\_id=c.con\_id;

COL owner FOR A15  
COL segment\_name FOR A20  
SELECT  
 name,   
 owner,  
 segment\_name,  
 tablespace\_name   
FROM  
 cdb\_segments a,  
 v$containers b  
WHERE   
 a.con\_id=b.con\_id AND   
 a.tablespace\_name IN (  
 SELECT  
 d.name  
 FROM  
 v$encrypted\_tablespaces c,  
 v$tablespace d  
 WHERE  
 c.ts#=d.ts#);

## Container Information *CDB\_ENCRYPTED\_COLUMNS*

PROMPT cdb\_encrypted\_columns  
COL table\_name FOR A15  
COL column\_name FOR A10  
COL owner FOR A15  
COL encryption\_alg FOR A20  
  
SELECT   
 con\_id,  
 owner,  
 table\_name,   
 column\_name,  
 encryption\_alg  
FROM   
 cdb\_encrypted\_columns;

## Container Information *V$CONTAINERS*

PROMPT pdb\_plug\_in\_violations  
SET linesize window  
COL message FOR A50  
COL action FOR A50  
SET line 200  
SELECT   
 b.name,  
 type,  
 message,   
 action  
FROM  
 pdb\_plug\_in\_violations a ,  
 v$containers b  
WHERE   
 a.con\_id=b.con\_id AND   
 status != 'resolved';

## Client Secret Information *V$CLIENT\_SECRETS*

PROMPT v$client\_secrets  
COL owner\_dbname FOR A20  
COL owner\_pdbname FOR A15  
COL owner\_instance\_name FOR A15  
COL activation\_time FOR A35  
  
SELECT  
 owner,  
 keystore\_type,  
 owner\_dbname,  
 owner\_pdbname,  
 owner\_instance\_name,  
 creation\_time,  
 activation\_time  
FROM  
 v$client\_secrets;

1. This is the footnote. [↑](#footnote-ref-1)