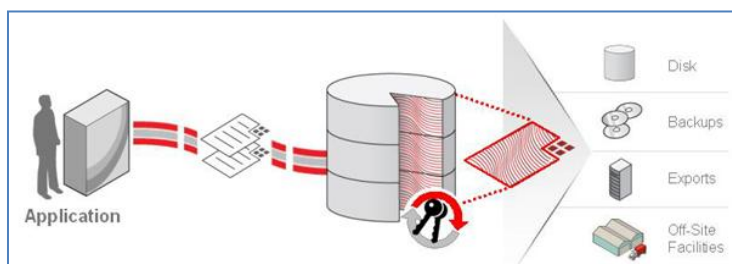


## TRANSPARENT DATA ENCRYPTION (TDE) FOR ORACLE FUSION CLOUD SERVICE

*Oracle Fusion Cloud Service customers may purchase an Advanced Security option to encrypt their data at rest using Transparent Data Encryption (TDE).*

### Transparent Data Encryption (TDE)

TDE provides an additional layer of protection against threats to Oracle Fusion Applications data, including business-critical and sensitive information, by encrypting Oracle Fusion Applications data when it is saved to disk.



TDE encrypts Oracle Fusion Applications data when it is saved to disk, thereby protecting against access to the data as it is stored in files on the operating system. DBF files (Database Files are the files that store data from the database on the file system) and database backups are encrypted, and they cannot be read even in the unlikely case that they are accessed, copied, or stolen on removable media.

### Tablespace Encryption

Oracle Fusion application cloud instances use tablespace-level encryption on all tablespaces that contain Fusion Application business data. Encrypted tablespaces primarily protect data from unauthorized access by means other than through the database. Additionally, encrypted tablespaces protect data from users who try to circumvent the security features of the database by accessing database files directly through the operating system file system. To maximize security, data from an encrypted tablespace remain encrypted when written to the undo tablespace, to the redo logs, or to any temporary tablespace.

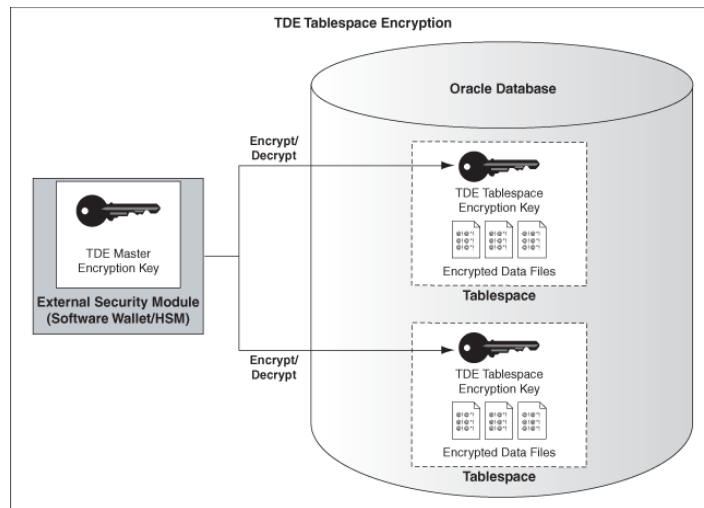
The following table lists the types of tablespaces that contain Fusion application data. These tablespaces are encrypted using TDE encryption.

Logical Tablespace Type	Physical Tablespace	Object Type
SUMMARY	FUSION_TS_SUMMA	MVs and MV logs
TRANSACTION_TABLES	FUSION_TS_TX_DATA	Transactional tables
TRANSACTION_INDEXES	FUSION_TS_TX_IDX	Indexes on transactional tables
REFERENCE	FUSION_TS_SEED	Setup/seed tables
INTERFACE	FUSION_TS_ARCHI VE	Interface tables
MEDIA	FUSION_TS_MEDIA	Tables with multimedia objects, such as text, video, sound, graphics, and spatial data
TOOLS	FUSION_TS_TOOLS	Tables that are part of other third-party products or tools
QA	FUSION_TS_QUEUE S	QA\$ and its related tables (_H, _I, _T, _S, _R)

### Encryption Key Management

To prevent unauthorized decryption, TDE stores the encryption keys in a security module external to the database - the Oracle Wallet. TDE uses a two-tier key architecture for flexible and non-intrusive key rotation and least operational and performance impact. Each encrypted tablespace has its own tablespace key. Tablespace keys are stored in the header of the tablespace and in the header of each underlying OS file that makes up the tablespace. Each of these keys is encrypted with the TDE master encryption key, which is stored outside of the database in an Oracle Wallet (a PKCS#12 formatted file that is encrypted using a passphrase supplied by the designated security administrator during setup). Tablespace keys are AES (with 128-bit key length), while the TDE master key is always an AES256 key.

The following figure shows the two-tier encryption key architecture.



Each tablespace within the database has its own encryption key, and those keys are then encrypted within the Oracle Wallet by the master encryption key. The Oracle Wallet is additionally secured by a password.

## Contact Us

For more information about Oracle Fusion Cloud Service, visit [oracle.com](http://oracle.com) or call +1.800.ORACLE1 to speak to an Oracle representative.



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