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1: Concurrency Control

a. MySQL supports all four transaction isolation levels: read uncommitted, read committed, repeatable read, and serializable. The degrees of consistency which we learned in class include degree 0 in which the transaction does not overwrite any dirty data from other transactions. MySQL supports degree 0 since it does not perform blind-writes or overwrite other data that has not been committed. The next degree we learned in class is degree 1, in this degree, the transaction does not commit any writes until the end of the transaction. MySQL also supports degree 1 since it also commits writes at the end of the transaction. The next degree that was learned in class is degree 2, in this degree, the transaction does not read in any dirty data from other transactions. This criteria is not met by MySQL because the system allows for reading uncommitted data. Therefore MySQL cannot be classified as degree 2 as we have learned in class. There are additional features that the MySQL system supports that we have not discussed. The most significant one is allowing for repeatable reads, this inconsistency can be prevented through the use of degree 3 which ensures that all repeated reads are consistent.

b. Microsoft SQL Server offers the following labels; read uncommitted, read committed, repeatable read, snapshot, and serializable. The degrees of consistency which we learned in class include degree 0 in which the transaction does not overwrite any dirty data from other transactions. Microsoft SQL Server supports degree 0 since it does not perform blind-writes or overwrite other data that has not been committed. The next degree we learned in class is degree 1, in this degree, the transaction does not commit any writes until the end of the transaction. The Microsoft SQL Server also supports degree 1 since it also commits writes at the end of the transaction. The next degree that was learned in class is degree 2, in this degree, the transaction does not read in any dirty data from other transactions. This criteria is not met by the Microsoft SQL Server because the system allows for reading uncommitted data. Therefore the Microsoft SQL Server cannot be classified as degree 2 as we have learned in class. There are additional features that the Microsoft SQL Server system supports that we have not discussed. The primary features include allowing for repeatable reads and snapshot. As stated for MySQL, the inconsistency of allowing repeatable reads can be prevented through the use of degree 3

which ensures that the reads are consistent. According to AppDynamics's Transaction Snapshots documentation, "A transaction snapshot depicts a set of diagnostic data, taken at a certain point in time, for an individual transaction across all app servers through which the transaction has passed." The Microsoft SQL Server features of incorporation snapshot as an additional degree of consistency is very unique and provides an additional transaction isolation level.

c. Oracle Database Systems offers the following transaction isolation levels: read committed isolation level, serializable isolation level, read-only isolation level. The degrees of consistency which we learned in class include degree 0 in which the transaction does not overwrite any dirty data from other transactions. Oracle Database Systems supports degree 0 since it does not perform blind-writes or overwrite other data that has not been committed. The next degree we learned in class is degree 1, in this degree, the transaction does not commit any writes until the end of the transaction. Oracle Database Systems also supports degree 1 since it also commits writes at the end of the transaction. The next degree that was learned in class is degree 2, in this degree, the transaction does not read in any dirty data from other transactions. This criteria is met by Oracle Database Systems because the system only allows for reading committed data. Therefore Oracle Database Systems can be classified as degree 2. The next and final degree which we covered in class is degree 3, in this degree, other transactions can not dirty any data read by the transaction before the transaction completes. Since Oracle Database Systems only allows reading committed data, and contains read-only isolation level, this system can be further classified as degree 3. We can also state that Oracle Database Systems utilizes 2 phase locking, since in order to be classified as 2PL the system must be considered to be in degree 3.