K2 DATABASE CONSOLIDATION TOOL 1.9

2016/01/15

INTRODUCTION

The K2 Database Consolidation Tool is used to consolidate multiple K2 databases into a single database. Prior to K2 blackpearl 4.6, multiple databases on the same SQL instance were created during the installation of K2 blackpearl.

With clean installs of 4.6 and later, a single database is created. If previous versions are upgraded to 4.6 or later, the multiple databases are upgraded but not consolidated. This tool is used to consolidate the existing multiple K2 databases into a single K2 database.

> **IMPORTANT:**
> 1. K2 recommends that if you are still running on multiple databases (legacy databases) that you consolidate your databases in K2 4.6.11.
> 2. If consolidating your K2 4.6.11 environment the mimimum version required is K2 4.6.11.1 (K2 blackpearl 4.6.11 (4.12060.1731.1). To get to this version from 4.6.11 you can use the K2 Update Manager 4.6.11.1 available on the K2 Partner and Customer Portal.
> 3. The next K2 update (K2 4.6.12) will require a single database before you can upgrade.

PREREQUISITES

- The tool must be run on the SQL server that contains the K2 product databases.
- The tool should be run by a user with System Administration (sysadmin) rights on the SQL Server.
- The tool is compatible with the SQL Server versions supported by the K2 blackpearl version supported. For more information, please view the Compatibility Matrix: http://help.k2.com/blackpearl/support-matrix#SQLServer
- The tool requires free space on the SQL Server equal to twice the current size of all K2 databases + current size of all K2 databases SQL logs. K2 Databases + K2 Logs x 2.
- The tool is compatible with K2 blackpearl and K2 smartforms versions per the following Release Compatibility table. The installed versions for K2 products can be found via Programs and Features in Control Panel.

The tool checks that the following SQL Server Feature Pack options are installed on the machine:

- Microsoft System CLR Types for SQL Server 2012
- Microsoft SQL Server 2012 Management Objects

If they are not present, the tool will inform you and exit. If you see this message, install the redistributables from the tool's **redist** folder and re-run the K2 Database Consolidation Tool.

> **NOTE**: The K2 connect database is not part of database consolidation. K2 connect does not require any re-configuration post-consolidation.

Release Compatibility										
Currently Installed K2 Product Version	**K2 Database Consolidation Tool Version**									
	1.9	1.8	1.7	1.6	1.5	1.4	1.3	1.2	1.1	1.0
K2 blackpearl										
4.6.5	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
4.6.6	✓	✓	✓	✓	✓	✓	✓	✓	✓	
4.6.7	✓	✓	✓	✓	✓	✓				
4.6.8	✓	✓	✓	✓	✓					
4.6.9	✓	✓	✓	✓						
4.6.10	✓	✓	✓							
4.6.11.1	✓	✓								
K2 smartforms										
1.0.1										✓
1.0.2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
1.0.3	✓	✓	✓	✓	✓	✓	✓	✓	✓	
1.0.4	✓	✓	✓	✓	✓	✓	✓	✓		
1.0.5	✓	✓	✓	✓	✓	✓	✓			
1.0.6	✓	✓	✓	✓	✓	✓				
1.0.7	✓	✓	✓	✓	✓					
4.6.9	✓	✓	✓	✓						
4.6.10	✓	✓	✓							
4.6.11.1	✓	✓								
K2 Package and Deployment										
1.0	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
K2 for SharePoint (2013)										
1.0										
1.0.1	✓	✓	✓	✓	✓					
4.6.9	✓	✓	✓	✓						
4.6.10	✓	✓	✓							
4.6.11.1	✓	✓								

INSTALLATION

The K2 Database Consolidation Tool is downloaded as a self-extracting file. When executed, choose the folder to contain the extracted files.

USAGE

> **IMPORTANT**: **Backup** all databases before using the K2 Database Consolidation Tool.

To start the tool, execute **SourceCode.Database.Consolidator.exe** in the extracted files directory.

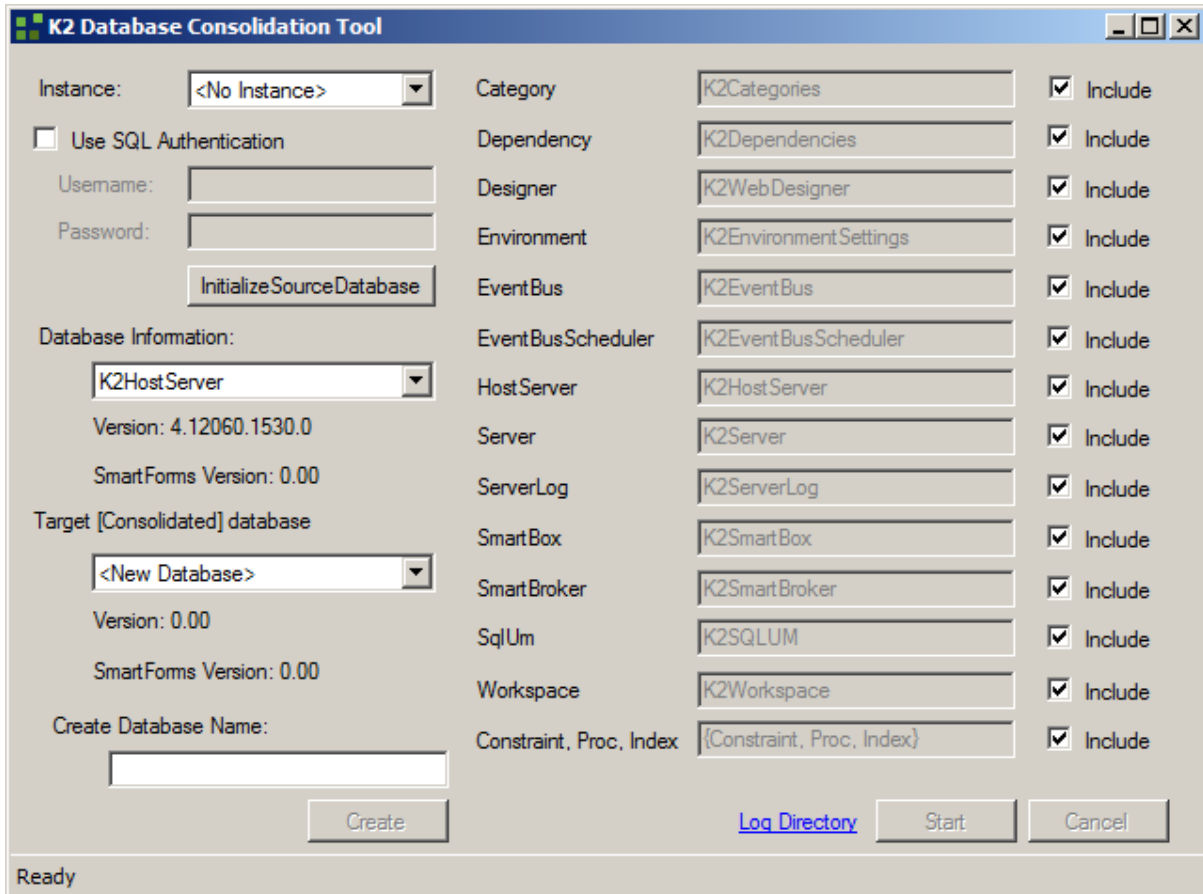The main dialog is shown in Figure 1:

Figure 1. The K2 Database Consolidation Tool.

Field	Description
Instance	Select the SQL instance hosting the K2 databases to be consolidated. The tool automatically detects the K2 databases independent of the database name, the <No Instance> value means you are not using a named instance.
Use SQL Authentication	If SQL authentication is to be used, enter a username and password, and initialize the source database.
Database Information	This shows the version of K2 blackpearl and optionally K2 smartforms installed on the system.
Target database	This drop-down lists the databases on the system and allows for the option of creating a new database. If **<New Database>** is selected, a database name needs to be entered in the **Create New Database Name:** text-box below

	and then the **Create** button will be enabled. Once clicked the application will create the new database. The 'Create New Database Name' and 'Create' button will not show if <New Database> is not selected.
Database list	The database list shows the K2 database and its name on your system. If the tool is re-run, the greyed-out check boxes in the database list show which databases have already been consolidated (see Considerations point 7). **Note:** All databases must be successfully consolidated before you can run the K2 Setup Manager to configure the K2 server.
Log directory	The Log Directory link will open the K2 log folder in the system (..Temp\K2 Setup Log\)
Status bar	The status bar displays the consolidation progress. An error in consolidation will display in red text.

Click the **Start** button to consolidate the databases; the larger the size of the databases being consolidated, the longer the consolidation operation will take. As a general rule allow 1 hour per 11GB of data.

The tool will prevent consolidation when the K2 Server is running. Please stop all K2 Servers before consolidating.
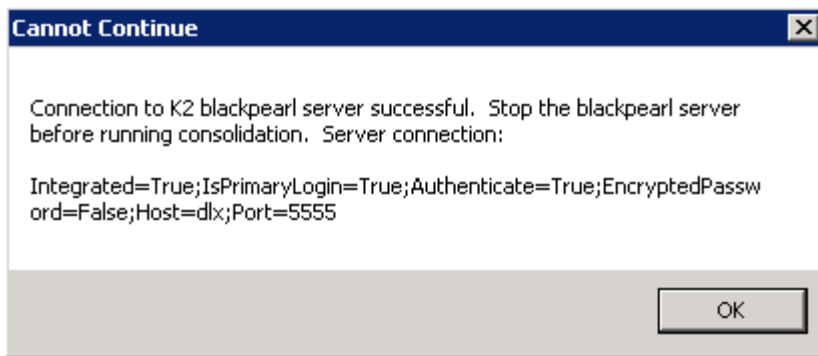

Figure 2. Error shown when K2 Server is running.

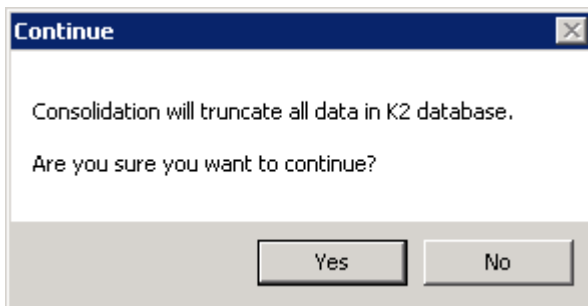You will be prompted with a warning before the consolidation process is started.

Figure 3. Data truncation warning.

This means that all data in the target database will be deleted. Therefore the recommendation is to create a new database and not use an existing database containing data as that data will be deleted.

CONSIDERATIONS

1. You should use a database created by the K2 Database Consolidation Tool as the target database.
2. You must create the database in the same SQL instance as the source databases.
3. The tool is compatible with the SQL Server versions supported by the K2 blackpearl version supported. For more information, please view the Compatibility Matrix: http://help.k2.com/blackpearlmatrix.aspx#SQLServer
4. The tool defaults to Windows authentication. SQL Authentication is also supported.
5. All source databases are marked as Read-Only before the consolidation starts to ensure integrity of the data, and will not be set back to write mode by the tool. If consolidation fails for any reason and the original source databases need to be brought back online, this must be done manually through SQL Server tooling.
6. All schemas are selected by default and the tool tracks which schemas have successfully been consolidated. This feature is intended to support a 'restart/re-run scenario if there is a failure on a few schemas while there was success on others. Consolidation will not be successful unless all schemas have been consolidated and constraints, stored procedures and indexes have been applied.
7. SmartBox tables remain in the dbo schema after consolidation.
8. Once the databases are consolidated, the original schema and table names are retained under the new database name. The format is: [NewDbName].[SchemaName].[TableName]
9. The K2WebWorkflow database is a legacy database that is not consolidated. If present, the K2WebWorkflow database is not set to Read-Only.
10. If a K2 coldfix involving any SQL changes, for example stored procedure changes, has been previously applied to the K2 environment, you should contact support to ensure you have a fix to add the changes again after the consolidation has run. The consolidation tool requires a reconfigure of K2 to be run after consolidation and this will overwrite the coldfix stored procedure changes.

CONSIDERATIONS FOR MULTIPLE DOMAINS

Running the Database Consolidation tool preserves all configuration settings, but running a reconfiguration afterwards resets the **Authinit** and **Roleinit** settings. In order to recover thesesettings from the legacy K2HostServer database, run the following script:

```
update [K2New].[HostServer].[SecurityLabel]
set AuthInit = (Select AuthInit from
[K2HostServer].[HostServer].[SecurityLabel] where
SecurityLabelName='K2'),
RoleInit = (Select RoleInit from
```

```
[K2HostServer].[HostServer].[SecurityLabel] where
SecurityLabelName='K2')
where SecurityLabelName='K2'
```

Be sure to replace the database names with the values from your environment.

## CONSIDERATIONS FOR LARGE DATABASES (+100GB)

1. It is imperative to **test your consolidation with an offline backup of your production database** before attempting to consolidate your active production databases.
2. Consolidation of databases takes approximately 1 hour per 11GB. Please plan adequate time for performing this task before scheduling an outage period.
3. If your calculated duration of consolidation exceeds your planned outage period, it is advised that you reduce the size of your databases before consolidation. This can be performed by means of archiving some of your completed process instances.
4. You can restore archived data back to your consolidated database after your consolidation effort.
5. Always use a staggered approach (piecemeal mode) for your consolidation. Therefore consolidate your largest databases separately and consecutively rather than all at once. This will reduce any possibility for unplanned issues. Please see the section below with further instructions for large databases.

INSTRUCTIONS

1. **Backup** all databases before using the K2 Database Consolidation Tool. **This is a required step to shrink your database log file.**
2. Stop the K2 blackpearl Hostserver services in the environment.
3. Run SourceCode.Database.Consolidator.exe on the SQL server containing the K2 databases.
4. Select <New Database> for the Target [Consolidated] database.
5. Provide a name in the Create Database Name textbox and click Create to create the new target database. See Moving Log files or Data files.
6. Click Start to run the consolidation. Be patient, the time it takes will depend on the size of the source databases. The status bar shows you the progress to indicate the start and finish of each table transferred.
7. Upon completion, a Consolidation Successful message appears. The message contains the location of a ReconfigureServer.ps1 PowerShell script (same directory as the tool). This script should be run on the K2 servers to update the K2 Setup Manager to use the new consolidated database.
8. Copy the ReconfigureServer.ps1 file to the K2 blackpearl server and run it using Microsoft PowerShell. In K2 Server farm environments, the script should only be copied to the first server.
9. Perform steps 10-11 on **each** of the K2 blackpearl servers in your environment.
10. Start K2 blackpearl Setup Manager. **NOTE**: The PowerShell script runs the K2 blackpearl Setup Manager automatically on the first server.

11. Select "Configure K2 blackpearl" and step through the K2 Setup Manager leaving all values as they were until you get to the Database Configurations panel.

    a. If the PowerShell script was executed, the panel should correctly display the single consolidated database with the Status=Update.
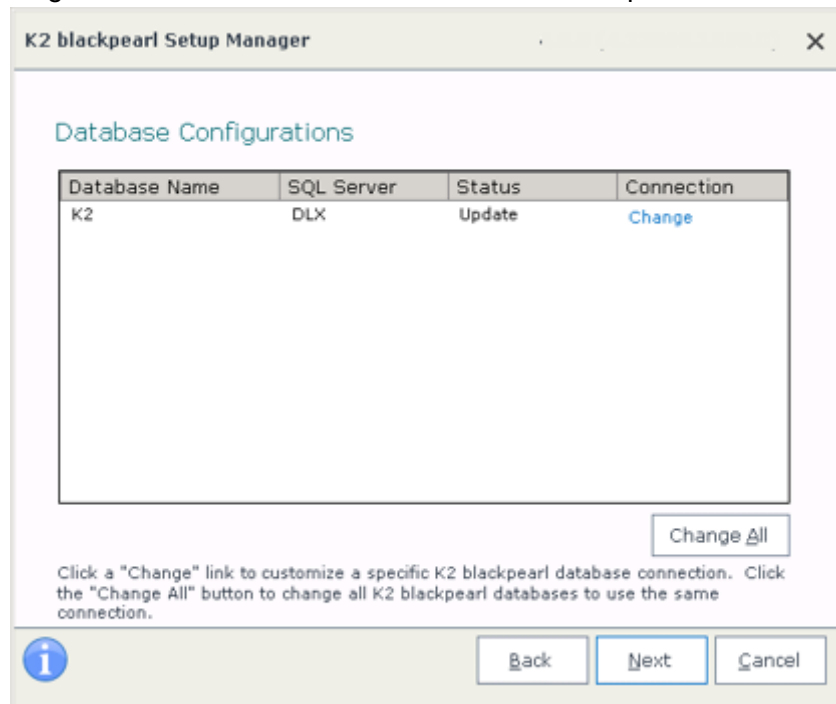
    b. If the PowerShell script was not executed, the panel will show the original databases. Ensure you run the powershell script before continuing then refer back to step a.

12. Perform steps 13-14 on **each** K2 smartforms server in your environment (including all design and runtime sites).

13. Start K2 smartforms Setup Manager. Select "Configure K2 smartforms" and continue to the K2 Server Database panel.

14. Provide the value for the new consolidated database in the Name field and continue through the K2 smartforms Setup Manager leaving all values as they were.

15. Perform steps 16-17 on **each** K2 Package and Deployment server in your environment if applicable.
16. Start K2 Package and Deployment Setup Manager. Select "Configure K2 Package and Deployment" and continue to the K2 Server Database panel.
17. Provide the value for the new consolidated database in the Database Name field and continue through the K2 Package and Deployment Setup Manager leaving all values as they were.

18. If K2 for SharePoint (2010) has been installed, it is necessary to re-activate the K2 features for all the previously activated Site Collections (*SharePoint 2010 Central Administration > K2 for SharePoint > Activate All K2 Features and K2 Configuration Settings*). Activation is necessary to ensure that the K2 Designer for SharePoint will not have "SharePoint Application Pool user" SQL login failures.

19. If K2 for SharePoint (2013) has been installed, it is necessary to deploy the App after consolidating the databases by running AppDeployment.exe.

INSTRUCTIONS IF THE K2 DATABASE IS ON A SQL CLUSTER

1. Place the Consolidation Tool on the active node.
2. Check that you can connect to the SQL instance using the active node's hostname. If not, set a local host file entry for the hostname pointing to the Cluster NIC IP address.
3. After the consolidation the PowerShell script is generated. Open it in edit mode and ensure that the database connection string uses the SQL Cluster address and not the node name. Then save the script with the correct connection string.

MOVING LOG FILES OR DATA FILES

After you select "new database" from the drop-down "Target [Consolidated] database" and create a new empty database, this will create a number of data files (*.ndf files) and log files (*.ldf files). These are located in the default location on the file system. If the log file and/or main data files need to be moved to a different location follow these steps:

1. Close the Database Consolidation Tool after creating the new database.
2. Detach the new database from the SQL instance, relocate the *.ndf and/or *.ldf files to their correct locations on the file system and reattach the database.
3. Continue with steps by running the tool and selecting the new database.
4. For the target database set the Max Size to unlimited and file growth to 1GB for large databases.

REDUCING THE SIZE OF YOUR DATABASES THROUGH ARCHIVING

Archiving some of your data before consolidation is the best approach to reduce your database size and reduce the execution time of your consolidation effort.

Archiving can be performed in two ways:

- Through K2 Workspace (not recommended for archiving large amounts of data)
- Through means of a stored procedure (recommended for archiving large amounts of data)

ARCHIVING CONSIDERATIONS

1. Archiving will not affect normal K2 Server operations but it might have an impact on performance of data reporting during archiving. It is therefore advised to perform this task during off-peak hours.
2. Data is only archived from your K2Serverlog database.
3. K2 only archives completed process instances.
4. Data can only be archived according to a time period. You cannot archive only specific process instances or set an archive size.

5. Archiving through K2 Workspace will not shrink your database after archiving completes. You will be required to perform this task manually.

6. Archiving through the stored procedure will shrink your databases after archiving completes.

7. You will require approximately 4 times the amount of hard drive space occupied by the K2Serverlog database during processing. This space is freed up after the archiving is complete.

8. You can only archive to the same SQL instance or server where the current database resides.

9. You can restore archived data back to your consolidated database after your consolidation.

10. You should only perform a K2 version update after restoring archived data -- your archive data and current database should be on the same version of K2.

11. If you do not want to archive the ServerLog and would alternatively set a large database to Read-Only, rather set the database to Read-Only manually on SQL before running the consolidation through the tool. If you set the Read-Only using the Consolidation Tool you might experience time-outs.

You can request the stored procedure (mArchive) from K2 support.

For instructions on using K2 Workspace for archiving, please see the following links:

- K2 blackpearl User Guide – Workflow Server – Archiving Topic: http://help.k2.com/onlinehelp/k2blackpearl/userguide/current/webframe.html#reference-ws_mcon-workflow-archiving.html
- K2 Archiving KB article: http://help.k2.com/kB000322

INSTRUCTIONS FOR USING THE ARCHIVING STORED PROCEDURE

The stored procedure version supports the following K2 versions:

K2 Version	mArchive v1.3	mArchive v1.2
4.6.11	X	
4.6.10	X	
4.6.9	X	
4.6.8	X	
4.6.7	X	
4.6.6		X
4.6.5		X

NOTE: Execution of the archiving stored procedure should be executed by a qualified DBA.

1. Create the stored procedure (mArchive) on the K2ServerLog (the databases has to be on the same instance. We don't support multiple instances.

2. Create a new blank database on the same instance as the K2 database and take note of the archive database name.

3. Execute the stored procedure and specify the following parameters

Parameter	Description
@logDB	Name of the K2Log database to archive

@arcDB	Name of the database to archive data to
@FromDate	Start Date to archive
@ToDate	End Date to archive
@RunInTransaction	1 = use commit and rollback (0 = run without a transaction) (only if @ShrinkK2LogDBLog = 0 & @ShrinkK2ArchiveDBLog = 0) If 1 selected in this option -
@ShrinkK2LogDBLog	1 = Shrink the K2 log database before and during (only if @RunInTransaction = 0)
@ShrinkK2ArchiveDBLog	1 = Shrink the archive database before and during (only if @RunInTransaction = 0)
@ShrinkK2LogDBLogAtEnd	1 = Shrink the K2 log database after
@ShrinkK2ArchiveDBLogAtEnd	1 = Shrink the archive database after

4. The mArchive stored procedure creates a mArchiveBackupLog stored procedure which it uses to backup/shrink the database log if the shrink options are used.
5. mArchiveBackupLog stored procedure can be removed after executing the mArchive stored proc. It is recreated every time the mArchive stored procedure is executed.

Example Stored Procedure

The following example would archive all data from January 1 2005 through July 1 2014, in a transaction.

```
EXEC @return_value = [dbo].[mArchive]
          @logDB = N'K2ServerLog',
          @arcDB = N'K2Archive',
          @FromDate = N'2005-01-01',
          @ToDate = N'2014-07-01',
          @RunInTransaction = 1,
          @ShrinkK2LogDBLog = 0,
          @ShrinkK2ArchiveDBLog = 0,
          @ShrinkK2LogDBLogAtEnd = 0,
          @ShrinkK2ArchiveDBLogAtEnd = 0
```

INSTRUCTIONS FOR LARGE DATABASES

1. Stop the K2 blackpearl Hostserver services in the environment.
2. **Backup** all databases.
3. Execute a test run with a copy of your backed up databases. This should be done on an isolated environment. K2 is not required to be installed, only the prerequisites as mentioned above.
4. Calculate the required time for outage period. If the consolidation will exceed your outage period, reduce your database size through archiving (see section on archiving above).
5. Or, use a staggered approach to consolidate your databases (piecemeal mode):
   a. First, identify your largest databases.
   b. Start the consolidation tool and select only the largest database.
   c. After completion, backup the destination database. If the next step fails, you can roll back to the previous step easily.

      d. Consolidate the next largest database

      e. After completion, backup the destination database. If the next step fails, you can roll back to the previous step easily.

      f. Continue until only small databases are left.

      g. Select all other small schemas and run the consolidation wizard one last time. (eg [HostServer], [Category], etc)

TEST AND VALIDATION

1. It is recommended to take the old database offline to ensure that nothing is accessing that database in read-only mode.

2. Regression testing should span all areas of the product including various clients at design time, runtime for SmartObjects, Workflow, SmartForms, Web sites, etc.

      a. It is recommended that this be executed within a non-Production environment first so as to allow for complete solution regression testing.

SAMPLE CONSOLIDATION DATA

The following average consolidation times on a test machine running Windows Server 2008 R2, SQL Server 2008 R2, 64-bit, dual core with 6 GB RAM.

Average Minutes per GB: 4.20

Average GBs per Hour: 15.06

These averages are provided for reference only and may not reflect the actual times in your environment. Please test and plan accordingly.