LS Data Director 3.02.32

User Guide

December 2018

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1 Introduction

The Data Director (DD) is a product of LS Retail ehf, the developers of the LS Retail Back Office system and the LS POS point-of-sale application. The Data Director is closely tied to these applications and plays an integral part in enabling the system to function as a whole in a distributed environment.

The Data Director is an application specialized in moving data between databases in a fast and efficient way. It works intimately with the Microsoft Dynamics NAV platform but it is not limited to that platform. It can just as easily move data between other databases such as MS SQL Server & MySQL. Generally, if the database supports the Microsoft OleDB or ODBC interface the Data Director should be able to use it.

The Data Director is a flexible tool that can be adapted to a variety of data transfer scenarios. The most commonly used configurations are for:

- Moving data between the head-office, stores and Point-of-Sale Terminals (POS Terminals) in a Dynamics NAV based retail organization.
- Moving data from Dynamics NAV based databases into a data warehouse running on Microsoft SQL Server.

2 How the Data Director Works

The Data Director's main functionality is to move data between two or more databases as efficiently as possible. It accomplishes this by aggregating data into as few packages as possible thus minimizing the amount of data transmitted over the network. These packages are processed in a multicast like way enabling the Data Director to handle a very high count of end points.

The Data Director (DD) is run as a service and listens for incoming requests or packages. The client component (like the TransAutomClient) is used from LS Retail in order to interact with the Data Director Service and tell it what to do. There are two types of interactions: Request to read data from the database, and request to write data to the database.

If the DD receives a read instruction, it will start by connecting to the source database. It then proceeds to read data from the database and stores it in a package. The package can contain data from more than one database table.

Once the requested data has been read, the DD has two possibilities. The first is to write the data in the package directly into another database or to forward the package to one or more DDs. Once the package has been received by the receiving DD, it can proceed to write the contents of the package into one or more destination databases, all according to instructions contained in the package. This provides an easy and convenient way to transfer data between different databases, since the DD converts the data along the way, making sure the destination database understands it.

The feature of being able to forward one package to more than one DD is very useful in the retail environment since you often have to distribute price changes or updates to some product items to all or some of the stores. This is done automatically by the DD once it has been configured, enabling the user to focus on running the stores.

The DD and client components do not need to be installed on the same computer. The client component can connect to a DD running on other host computers. This makes it easy to create a network of Data Directors that can be controlled from one central location.

3 Hardware and Software Requirements

The Data Director requires the following resources in order to run properly:

3.1 Hardware

- At least 1 GB of available RAM. The base processes use around 100-200 MB of RAM for normal operation. The amount of RAM required depends on size of database queries that DD needs to perform.
- 100 MB disk space for the base application. This is the absolute minimum space required. The additional disk space required when moving data depends on the amount of data and how frequently it is moved. You should have at least 10 GB free on your hard drive for the temporary data generated by the DD.
- A Dual Core processor or better. The DD is a CPU intensive application, especially when processing data, so a faster processor usually means improved performance.

3.2 Software

- Refer to the release notes of the DD for supported operating systems and databases.
- The DD needs 2-3 user sessions in the database it is processing data to and from. The number of user sessions depends on the functionality used and Data Thread setting in the DD Configuration tool. For normal operation DD uses one session for query data, one session for insert/update and then one or more sessions for incoming TS requests.
- The databases which the DD needs to connect to should have TCP/IP protocol active and port open in Firewall.

4 Installation

4.1 Prerequisites

There are a few things, as listed below, that you need to keep in mind before setting up the Data Director on Dynamics NAV with LS Nav.

- You should have a solid understanding of the TCP/IP networking protocol. You should know how IP addresses can be assigned and be able to use tools such as ping and tracert. You must be able to assign names to an IP number, preferably using a DNS server or the local hosts file.
- You should know how to work with Microsoft Windows Services and view events from the Event Log.
- Make sure that you have the necessary permissions to install programs and be able to start and stop services on the computer running the DD service.
- You should have a working knowledge of Microsoft Dynamics NAV. The setup of the DD might require an installation of a Dynamics NAV database server.
- Make sure that you have a Dynamics NAV License file (.flf) that allows you to access the DD application objects within Dynamics NAV and the CFront API.

4.2 Security Considerations

Most data communication tools like the DD will need access to your organization's databases in order to move data between them. For security purposes, you should restrict the DD's access to the database tables that it needs to read or write into. This is important because, unlike regular database users, the DD can effectively access any table in your database, as it is not restricted to viewing data via a graphical user interface. By choosing not to restrict the DD's access to your database, you risk giving users access to data that they should not have access to.

Most database systems allow database administrators to set user access permissions relatively easily. It is strongly recommended that you spend some time specifying access permissions for the user account that the DD will use to access your database. For example, the Dynamics NAV security system provides a powerful feature that limits a user's access to database tables only, making the user account useless to regular users since they do not have access to the database's graphic user interface. Similar features can be found in most other database systems. If this feature is available, it should preferably be used for all user accounts the DD uses.

4.3 Installing the Data Director

DD3 Runs on Framework 4.0 so you need to install it before you install DD3. Make sure to install Full Framework 4.0, not only the Client Profile version.

Install DD3 by running *LS.DataDirector.3.02.xx.Setup.exe.*
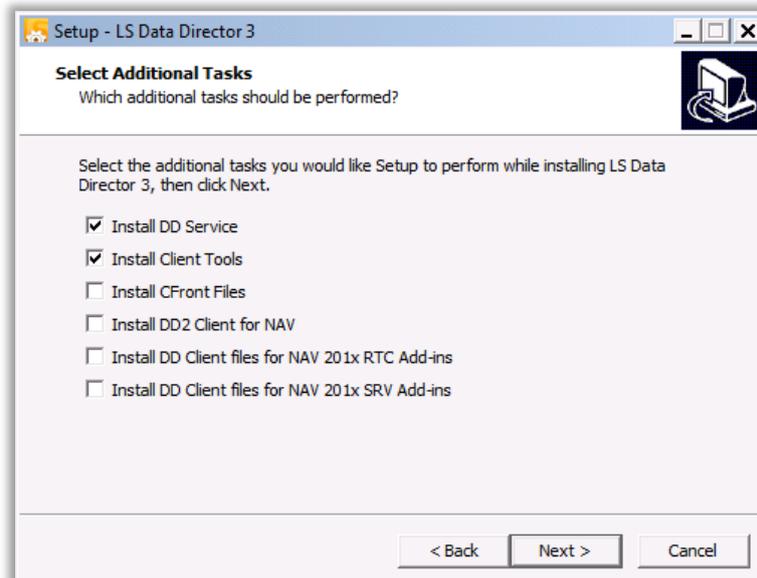
If all options are deselected, only DD Client files are installed without the Client Tools. These are the files needed for LS NAV or LS One to communicate with Data Director.

DD Service: DD Service that handles all the data transfer. If you are installing only client controls for LS Retail product like LS NAV or LS One, to be able to connect to DD Service on another host, then deselect this option and only the Client files will be installed.

Client Tools: Configuration Tool and Monitoring Tools for Data Director. If you do not want the tools to be available on this host, then deselect this option. DD can be configured and monitored remotely.

CFront Files: Files required making a connection to the NAV Database. If you are running an upgrade and have manually updated the CFront files to match your NAV setup, then deselect this so that the DD does not overwrite the current files.

DD2 Client for NAV: If you are installing controls for the LS NAV host and the CodeUnits, use either CFront Controls or DD Controls from the previous version of DD (DD2), then select this option. This installs all the DD2 Client files that are needed for NAV to communicate with DD. There is no need to install *LSRetailDDClient-2.28.x.exe* anymore. If you already have DD2 installed on the host, then there is no need to select this option.

DD Client files for NAV 201x RTC Add-ins: Add Client files to the Add-ins folder for latest NAV RTC Client. If there are more than one version of NAV installed, only newest version will get the files. You have to copy the files manually to the Add-ins folder for older versions.

DD Client files for NAV 201x SRV Add-ins: Add Client files to the Add-ins folder for latest NAV Middle Tier Server.

If the install cannot find the default install path for NAV it will bring up selection windows wher the install path where NAV is located, both for RTC and Service.

Installing DD with NAV 2009 or older, select **DD Service, Client Tools, CFront Files** and **DD2 Client for NAV**.

Installing DD with NAV 2013 or newer (and not support for older NAV), select **DD Service, Client Tools and DD Client files for NAV 201x both for RTC** and **SRV Add-ins.**

Installing DD with LS One Site Manager, select **DD Service** and **Client Tools**.

Installing DD Client files for POS that will not include DD Service, deselect all options and only the client files will be installed.

Depending on what options are selected, changes to DD Configuration will be made to match the selection if this is new installation.

DD3 can also run with DD2 Service installed, if you want to have both DD2 & DD3 on same computer, you need make sure that either one of them is running or change the Incoming Port on DD2 to another than the Default port 16750.

No configuration is needed to start up DD3 with default settings. After install, the DD will start up with a default configuration. If DD should connect to database with a trusted connection, you need to add Login to the DD Service to log on as a User that has access to read and write the data onto the database.

Open the Configuration Tool and upload the DD license, a demo DD license is installed when the DD is installed. If the DD is connected to NAV 2009 or older, upload the NAV Licenses file also under App Config tab.

NOTE: When installing DD for LS Retail NAV 6.x or older you need to change the Path to CFront in the Distribution Location card to point to the new folder where CFront is installed. The path is different from the default path that comes with the NAV standard data.

For install options via command line, see Appendix B

4.4   Update DD2 to DD3

When updating current systems running on DD2, the same method is best as recommended before. Start by updating Head Office with DD3, while stores and POS can still run on DD2. If Head Office had many DD or TS Services running on different ports, you can assign all of those Services and ports in the Configuration Tool. Type all services name into Aliases under the Basic Config tab and port numbers into the Data Ports field under App Config. No changes are required at the Stores and POS still running DD2.

You need to change the Distribution Location data at HO for each Host still running DD2 so DD3 can a send job to the old DD2. The port and communication mode needs to be added to the Distribution server name like this: HOST:16750:DDOLD

When the Store or POS has been updated to DD3, you can remove the extra port and mode values from the host name.

No change in Location Setup is needed at the POS or Store running DD2 to be able to communicate to HO running DD3.

4.5 TransAutomClient Control

With LS Retail NAV 6.2 and earlier, it is best to use the old DD2 client controls, as mentioned above. DD3 comes with a new TransAutomClient that is registered when you install DD3. To be able to use the new control, you need to change the TransAutomClient Automation control in all codeunits that communicate with DD. If the codeunit is using the older TransClient.ocx or DDClient.ocx, these need to be replaced as well to use Automation and point to TransAutomClient.dll.

Changing the control should be possible without any other change of code; all functions are the same and should stay the same after the control swap.

If you decide to use the TransAutomClient that comes with DD3, the name of the new control in the Automation list is TransAutomClient and the Class is TransAutomClient. You should also change out this call in the Code unit to get better error messages from the DD.

- Old code: IncMsg.CreateErrorString(DataClient.GetLastError())

- New code: DataClient.GetLastErrorMessage()

This change will display the real error message from the DD System, and not some number that usually does not tell us much.

4.6 Computer Host name and DD

DD works on host names but can also accept IP Address as Distribution Server name. When using IP Address DD needs to be able to map the IP Address to its host name, if not, it will reject the job.

When the DD starts up, it generates a default configuration file using the current Host of the computer it is running on. If you need to change the name of the computer, you need to regenerate the configuration file.

In Configuration Tool, go to System Config and press **Reset Config** button. This can be done also on remote DD host.

Current Configuration File can also be deleted or opened and change the host name within the file.

This file, *lsretail.config* is located on newer OS, like Win7 and Win2008 under *\ProgramData\LS Retail\Data Director* and on older OS like XP and Win2003 under *\Documents and Settings\All Users\Application Data\LS Retail\Data Director*.

NOTE: DD Service needs to be restarted after resetting the Configuration file or host name changes. The old host name needs to be removed from the Configuration Tool, and either type in new host name or restart the Configuration tool and it will add the current host name to its list.

5 Configuration

No special configuration is needed to start up the DD with default settings. When the DD Service is started for first time, the DD takes care of setting up default values. To access the configuration data, open up the Configuration Tool. The Configuration Tool takes care of all setting for the DD Service, Debugging and Status Monitoring. This tool can also connect to the remote DD Host and manage the configuration and debug the remote side.
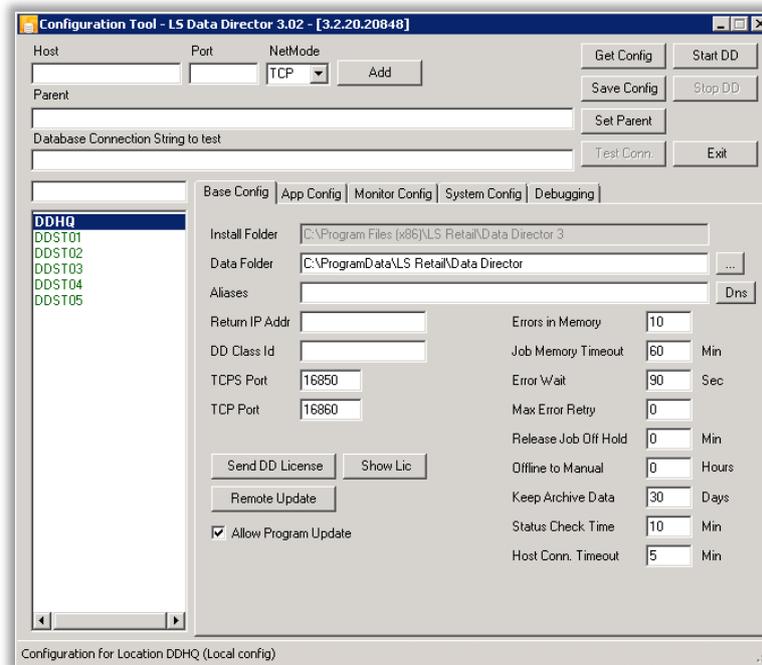
When you open up the Configuration Tool, you get the configuration for the DD at the Local Host. To get live configuration from the remote system, press the **Get Config** button. The host name will have green color if the configuration has been loaded, otherwise it is red. Bold Black means that the host is selected. If you hover over the field with the mouse, you can find information on what each field does.

5.1 DD Hosts
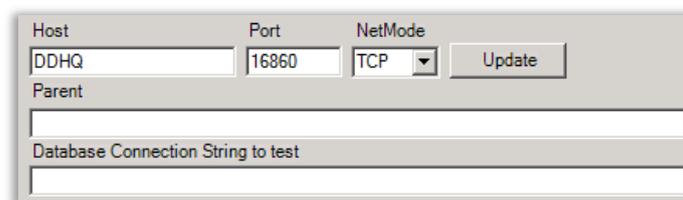
The fields above the Configure area are to add more DD3 hosts that you want to be able to administrate remotely. Enter the Host name of the DD host you want to add, and click on the **Update** button. If the DD Service is not running on the default port and network mode, enter the port number and then select the network mode. If you need to pass through another DD Host to be able to access this Remote host, select the Passing through host in the Host list, and click on the **Set as Parent** button to add it as Parent for this DD Host. The Connection string is only used for testing connections to databases from the DD Service. To test a connection to the DD and DB, click on **Test Connection** button.

To change any information for a DD Host, double-click on the host in the host list and the information for that host will be loaded into the fields. To update the data, click on the **Update** button.
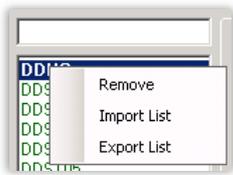
To remove a host from the list, select the host in the list and right click on the host choose **Remove** from the menu.

To Import long list of hosts into the list, right click on the list and choose **Import List**, select the file to import and press OK. The Host list can also be exported to text file. The File to import should have the Host Names set one host per line, with no other information. Sample of a Host file to import would be like this:

```
DDST01
DDST02
DDST03
```

To Filter Hosts or to look for specific hosts, you can type in the filter field above the host list some filtering text, this filters the host containing the filter. If you type in POS, you will get all the Hosts with POS somewhere in the host name.

5.2 Configuration Data for DD Host

If you change any settings, click on the **Save Config** button and then restart the Data Director Service to reload the configuration. If the DD system is already running on a local host and you want to update the configuration directly, click on the **Get Config** button and the configuration data will be loaded from the DD's memory. To send new configuration data back to a live DD system, click on the **Send Config** button and the data will become active right away, and no restart is needed.

You can also connect to remote DD Host and fetch the configuration setup from the remote host, by selecting a host from the list, and clicking on the **Get Config** button. You can change the settings, and then resend the configuration back to the host by clicking on the **Send Config** button. When the configuration is sent back, it will be reloaded live on the remote host, so there is no need for a restart on the remote host.

You can select more than one host in the list to get configuration data or an update. Press the Shift or Ctrl button while you select more hosts. All values that are same for all selected hosts are open for editing. You can also send DD and NAV license files to many hosts at once.

You can also use this method, Get and Send Config to update the Configuration data after upgrading DD to newer version as there may be some new configuration values added that are not include in the older version.

5.2.1 Basic Config

Basic configuration for base DD Service like location of data files, archive files and Ports settings for the DD. In addition, there are some values that the Router uses to deal with the Job Queue.

Install Folder	Base Folder where the DD binaries are installed.
Data Folder	Main folder where DD puts all its working files. This includes Job files, Data files, Debug files, Manual Job files and Temp files. This folder can contain a large amount of data, so there should be at least 10GB or more available.
Aliases	By default, DD works on local Computer Host name. You can assign Host Alias names to the DD Service so it will accept and process jobs with other host/service names. If you are upgrading from DD2 setup, then add all previous DD2 Service names in here. You can see what DNS Entries are found on the host by click on the DNS button.
Return IP Addr	IP address to use for external host to be able to send reply back to this host. If host name is not registered in DNS or Host file at destination, it will not be able to send reply back. If IP address is set, it will be used to replace the host name with IP address so the destination host can send reply back to this host.
DD Class Id	Class ID used in Monitoring system. This is to identify a group of DD networks together under one Class ID and can be used to group them together. This is for information only.
TCPS Port	Secured Connection port for incoming connections. The DD service needs to run on a user account/domain that is available on both hosts which has rights to communicate between the hosts.
TCP Port	Default Connection port for incoming connections. This is a standard open Connection between the hosts. It can be used when data is going from a Domain to a workgroup network where no trusted connection is available.
Errors in Memory	DD stores the latest error messages that it has reported in its memory. Indicate how many messages it should keep here. Even if there are errors in memory, it does not mean that the DD currently has a problem, it may be that the problem has already been solved. The purpose of this is just to look at the latest errors that have popped up in the DD. These errors can also be seen in the Event viewer under the LS Retail Events folder.

Job Memory Timeout	DD stores all jobs it has processed in its memory. This is to set for how long the DD should hold onto this information after the Job is Done. When using the Job Monitor to monitor the DD, it loads this list into the grid, when it connects, so you can see list of processed jobs from the last x min(s). This value does not apply to any unprocessed jobs or jobs that are in an error state. Jobs that have been removed from memory can be found in the Archive folder.
Error Wait	The time for DD to wait till it will try to process job on error again.
Max Error Retry	The number of tries DD will try to process a job on error until it will put the job On Hold. If the Value is set to 0, DD will try to process the job until it can or until job gets Canceled. Go to Job Monitor to release job Off Hold.
Release Job Off Hold	After jobs have been put On Hold, either manually or due to Max Error Retry limit, DD will release the job Off Hold after x min and try to process it again. If there is still error, job will go On Hold again if Max Error Retry is set.
Offline to Manual	The time to waiting for Offline host to Pull jobs. When time expires, the jobs will be moved from job queue to Outgoing folder for manual transfer. Jobs can be put back to processing in Job Monitor.
Keep Archive Data	The number of days to keep the Job data files in the Archive folder if Monitor Collection is not set up. If it is, then the Archive data files will be deleted as soon as the data has been collected.
Status Check Time	The time between DD Service checks for statuses on all unprocessed jobs locally and on Destination hosts. If DD does not get status update due to some problems or network connection it will send a status request to the Destination host and check for status update. This can also be done manually from the Job Monitor with Re-Check Status.
Host Conn. Timeout	The time to close TCP/IP connection to Destination host after job has been transferred. Reason for holding connection open is to save connection time on frequent small job transferring.
Send DD License	Send DD License to Local or remote DD hosts. Select Hosts from host list, press this button, choose the license file and press OK. This will generate DD License file Job that will be sent with DD to all destination hosts. See Job Monitor for result.
Show Lic	Show the DD License information at the DD Host.
Update Program	Send DD Setup file to update remote DD hosts, not local host. Select Hosts from host list, press this button, choose the new setup file and choose the install options that you want the install to include when the installation job is executed at the destination host. This will generate DD Update Job that will be sent with DD to all destination hosts and DD Service will be shut down, Setup will run and DD Service will be started up again. As the setup does not report back whether it was ok or not, you need to check the location to see if it has the new Version number after the update. You can see the Version number under the Debugging tab.
Allow Program Update	Allow a Remote DD program update. If not selected, Update DD remotely does not run on this host.

5.2.2   App Config

These are special values needed for each DD Process that runs in the background. You can activate or deactivate some functionalities of the DD here.

NAV SQL Replace Chr	The character to replace in Table/Field names to _ when using SQL to access NAV Database. If empty, defaults will be used, otherwise put in the chars that should be replaced with _ Defaults are: NAV 2009 [.'/] NAV 201x [.'/%] No replacement [X]
Decimal Fix	Fixes Rounding issues with decimal Data transfer. F05 indicates 5 decimal places. When dealing with large Decimal values that don't need high decimal places set it to BIG. BIG will only use 4 decimal places which leaves mores space for the main value.
IsoLevel	Default locking and row versioning behavior of Transact-SQL statements issued by a connection to SQL Server.
Ignore Extra Fields	Ignores any extra fields in job that is not available in the source or destination databases.
Use Trunc	If jobs include Delete all data, using Trunc will speed up delete process on large tables. This only works on SQL databases and Table cannot have any foreign key for this to work.
Use WS	User LS Nav Web Services for Source location. When pulling data from WS, it is done in batch of 100 records by default. This batch size can be modified by set batch value to Interger field in Scheduler Job - Object Setup section.
Timeout	The Idle Timeout for Database Connection to stay open after job processing. If set to 0, Database Connection is not keep alive but it may slow down processing. Each Database thread will take up 1 user session on the Database server.
FOB Timeout	FOB Import/Export Processing Timeout (only for NAV 2013 or newer)
SQL Timeout	SQL Command Timeout. Gets or sets the wait time before terminating the attempt to execute a command and generating an error.
CFront	Support CFront to communicate with NAV 2009 or older. When checked, extra number of DDDatabase86 processes will be executed, depending on Data Thread Limit. If not checked only x64 version of the DDDatabase process will run.

CodeUnit Permission	The CodeUnit used to set Permission for Data Director to access the Database.
CFront Path	The path where CFront Files are located for Dynamic NAV Database Access.
Send License	Send new or updated NAV license to DD Hosts. This will only update the NAV license that DD uses, not update NAV Server / Client installation.
Old DD Support	Activate Support for communication with DD version 2 and DD2 Client controls.
Data Ports	Incoming Port for DD2 Job Connections. If you are upgrading current DD2 setup, you need to add all ports that were used in the previous setup, including all TS ports in here. **Note: The DD needs to be restarted for this to take effect.**
Mon Port	Incoming Port for DD2 FOB Import Jobs and File Transfer Jobs (old DD2 monitor port). This port does not support other Monitoring commands or queries.
Timeout	DD2 Socket Timeout for send and connect.
Allow File Transfer	Allow a File Transfer via Monitor port to support DD2 File replication. **NOTE: This opens up full access to all Destination computer and could be used to compromise the system.**
Offline / Pull Support	Activate Job Pulling and/or Manual importing of Jobs for offline locations. If the DD is only supposed to send a Manual/Offline job, then this setting is not needed, it is only needed on host that is supposed to import Manual/Offline job.
Pull Host	DD Host to connect to for Job Offline pulling.
Check Interval	The time between Pull requests to the DD Host or Check Manual import files.
Pull Path	The path where Manual Job files are located. NOTE: Do not put the work folder path in here.
Pull Now	Run Pull from Host command now. This will execute the DDPullHost Program where you can see status of the Incoming Pull jobs.
Job Scheduler Service	Activate Job Scheduler Service to process Scheduler jobs from either LS One Site Manager or LS NAV.
Job Id	Job Id to run. For Site Manager Scheduler, if Job Id is left empty, all triggers in Scheduler database will be reloaded to activate any updates that have been made in the scheduler trigger setup.
Reload Trig / Run Job	Reload Scheduler Triggers if any trigger data has changed or Run Job by job id.
Test Conn	Test Connection to Scheduler Database from Scheduler service.
Conn String	Database Connection String for Scheduler Database where scheduler data is located. **Note:** For NAV database the string should always end with |ms|nav
Type Filter	Scheduler Job Type Code Filter to filter which jobs to run.
Nav Mode	Read scheduler data from LS NAV Database. This only works for Dynamic NAV running on SQL Server.
Sleep	The time between checks when pulling jobs from NAV database.

5.2.3 Monitor Config

Configuration for Monitoring Collection. This sets up process to gather all job files from the Archive folder and current status of job in processing and generates DD Job that will be sent to central database where DD Job data can be collected. LS NAV 6.3 or later has Administration Tool that can work with this Data. The Job Data will be inserted into 2 tables (DDMonitorHdr and DDMonitorLine) that can be used for reporting and statistic of DD processing. This is same data as found in the Job Monitor that comes with DD.

The Job Data can be sent to more than one database location by adding more destinations.

Monitor Collection	Activate Collection for Monitor Service.
Plugins	Select which plugin to run for collection and on what interval: • **ArchiveDataCollector:** Collects all Done Jobs and data from Archive folder. • **WorkDataCollector:** Collects data for all Jobs running in the DD memory. • **ResultDataCollector:** Collects result messages from manual locations from incoming folder set for Manual setup.
DD Host	Distribution Server DD Hosts that Monitor data should be sent to.
DB String	Database Connection string for Database where Data should be inserted.
Add Dest.	Add Monitor Destination to destination list (DD Host & DB String). Job data can be sent to more than one location.
Del Dest.	Remove Destination from destination list. To modify destination it has to be deleted and added again. To get current data, double-click on the line.
Test Conn	Test Connection for Monitor Destination. To get current data, double click on the line.

5.2.4   System Config

System settings are settings that affect the way that the DD communicates between hosts. These values should not be played with if you do not know what they stand for. Most of them require a restart of the DD to take effect.

Base Port	The Base Port used for all local DD Processes. Each process has an ID and the Port number for that process will be Base Port + Process ID. This generates the incoming port number for the process that will be used for debugging and other communication. It is not necessary to open these ports in a firewall unless you want to be able to remotely debug the system.
Data File Size	Maximum Size of a Job Data File allowed to be transferred between DD hosts.
Message Size	The maximum Size of Messages allowed to be sent between Processes and Hosts. This includes TS Requests, Configuration messages and Result Messages. If Message is too large, an error message will appear when sending TS Request. Increase this value to allow larger message transfer.
Compress Mode	Default Compression Mode to use on Data Files. ZipStream is same as DD2 uses, but this setting will not affect DD2 transfer.

Mode	File Size	Process Speed
ZipStream	Medium	Medium
ZipFile	Large	Fast
SevenZip	Small	Slow
None	Large	Fast

	It can take a load off the Store Server to set Compression mode to None on the POS that is sending Transactions in DD mode to a Store Server on the same network. These jobs are small and there is no need to compress the data. Compression is only needed on slow connections via WAN. If jobs are large and DD is running on a 32bit OS (x86) then DD may run into Memory issues with compression. ZipFile mode allows larger files on a 32bit OS. When using Size parameters to split up the files into file segments, then it will be applied to that mode even if it is not set as Default mode. Compression mode can be changed in the Job setup.
ZipFile Size	The size of each file segment when using ZipFile mode. If set to 0, no splitting will be done and only one big file will be generated.
7Zip File Size	The size of each file segment when using SevenZip mode. If set to 0, no splitting will be done and only one big file will be generated.

Shutdown Wait	The time DD Service waits between sending shutdown message to each DD Process when shutting down the DD Service.
Router Wait	The time DD Service waits after start the Router process before starting other DD processes as it may take some time for the Router process to load all pending jobs from work folder back into memory. Also used for idle time between Data File check and cleanup.
Kill Wait	The time DD Service waits for all processes to shut down before a kill command will be sent out to kill remaining processes.
Multi Job Processing	Works only for SQL Connection. Tells DD to allow processing of more than one Job type at same time. This will span more threads and requires more user licenses from the SQL Server. You need to increase Data Thread Limit also to allow more job processing at same time.
Forward Thread limit	Sets the limit of threads used to make connection to remote hosts and when forwarding jobs at the same time.
Data Thread limit	Sets the limit of threads used to connect to databases and process jobs at same time. If CFront mode is active under App Config, this set the number of Processes used to process CFront jobs (fin). Note: Each Data Thread takes up user license on the database server.
Data Thread Priority	Sets the Priority on Database Thread for Job Processing. This does not affect the Interactive (TS) processing.
Lock Code	Password for remote DD Configuration. If set DD will ask for password when sending configuration update. Lock code can only be set or changed on local configuration, not after Get Config button has been pressed. This is to prevent remotely changes on the Lock code.
ZipFile / 7Zip Pwd	Password to proctect ZipFile or SevenZip datafiles. The password has to be set on both Source and Destination DDs.
Open Timeout	The time provided for a connection to open before the transport raises an exception.
Data Send Timeout	The time provided for a write operation to complete before the transport raises an exception when sending job data files.
Config Send Timeout	The time provided for a write operation to complete before the transport raises an exception when sending configuration commands and TS requests.
Receive Timeout	The time that a connection can remain inactive, during which no application messages are received before it is dropped.
Max Connections	The value that controls the maximum number of connections to be pooled for subsequent reuse on the client and the maximum number of connections allowed being pending dispatch on the server.
Reset Config	Send Reset command to DD host to clear the Configuration file and load default configuration data as it is on clean install.

Timeout values

There are a few timeout values to adjust. To let the POS not hang, if a Store server is down, you can set the TS Timeout value in the Distribution Location card. This affects the total transfer time that POS is allowed to take when sending request to DD/TS. If the value is not set there then the Open and Send Timeouts in System Config will apply. If DD/TS have not finished processing the request before the TS Timeout expires, the request will be canceled. So make sure that this value is long enough for the request to finish otherwise it will end a good request prematurely. These values need to be set in the Configuration on the POS Host. You can run the DD Configuration tool to set these values there, even if the Host is not running any DD Services.

When setting these values on a host running a DD Service, then make sure the send value is set to long enough a time for the largest jobs to be able to be forwarded to next host. Also, do not set the TS Timeout values in the Distribution card for DD Jobs sent by the scheduler, as it may let the scheduler fail sending jobs to DD Service.

Data Threads, how does it all work?

DD uses two threads to process Database jobs. One is for Query jobs and another for Insert/Update. This means that the DD can be processing both jobs at same time. DD does this for each host that it's connecting to, so if the jobs are set up to use databases on two different hosts, the DD will have two Database threads for each host, one doing query and one for "done doing insert/update."

The Data Thread Limit value, limits DD on how many Databases DD will process at same time. If the value is set to two, the DD can process two Databases at the same time, and can process both queries and insert jobs for each host, so a total of four threads can be running. If this value is set to a high value, the DD will take up most of the CPU Power on the host.

When using CFront mode (App Config) Data Thread Limit controls how many Processes will be started to process CFront jobs. Because CFront is not designed to handle multithread processing, this is needed so DD can process more databases at same time without running into error.

You can also set the Thread Priority for the Database threads. If you set the priority on low, then even if the DD has taken up 100% CPU load, other programs on the computer should not become slow in operation. This priority only affects the Job Processing; it does not affect interactive requests like TS Queries.

When playing with these values, there is no one correct way of doing this, it all depends on what kind of data is being replicated and how powerful the computer is that the DD is running on, you should monitor the CPU Load, Disk Load and Network Load when adjusting this, and set the values to something that the computer, database and network can handle.

5.2.5 Debugging

Here you can look at the Debug stream from each DD Process and look at the Job Queue in the Router. If you run into a problem, this is the place to check what is going on. Local DD versions and build numbers are also displayed here.

When contacting LS Retail because of problems, you may be required to send the debug files and/or some other info that you can get from the Debugging tab.
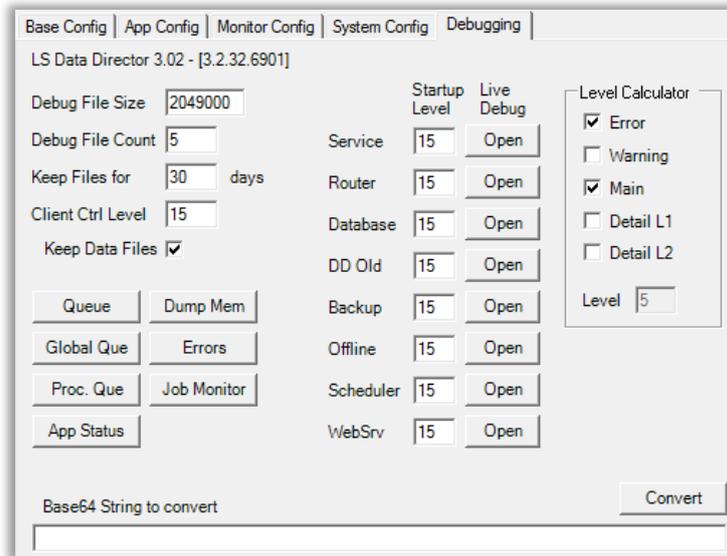
Queue	Show Processing Queues within the Router. To update the status click on the Queue button again.
Global Queue	Show a list of all of the Jobs in Router memory. This is both jobs in or waiting for processing and jobs that are Done within time frame set in Job Memory Timeout value. To update the list, click on the button again.
Dump Mem	Dump Router memory queue data to XML file for debugging.
Errors	Shows the latest errors detected by the system. The number of errors shown here is based on the Errors in Memory value.
Proc. Que	Process Queue that shows if any jobs are currently in processing and waiting for reply on any of the CFront Database Processes.
App Status	Shows the Running status of DD all Processes.
Job Monitor	Starts up a Job Monitor for the selected host.
Debug File Size	Maximum Size of each Debug file. When a Debug file reaches this size, a new file will be created.
Debug File Count	Maximum number of debug files to create. When the limit is reached, the DD will override the first Debug file.
Keep Files for	Maximun number of days that older debugging files from previous runs will be kept in the Log folder.
Client Ctrl Level	File Debug level for Client Control Debugging to generate debug log from the client DLLs. **Note:** Client using the files has to be restarted for logging to start.
Keep Data Files	Keep Job Data files after processing. Useful to look at data files after data has been replicated, but is not correct. **Note:** This will require lot of hard disk space to hold all the job files.
Startup Levels	File Debug level for each DD Process. This is used when the DD starts up and if its value is greater than 0, the DD will log the data onto file.
Base64 Convert	Translate Base64 Text String to readable text.

In order to find out which debug level value you should put in the Startup Level & Client Level, you can use the Level Calculator to calculate the value for you. Check the levels you want to log and then you can double-click on the **Startup Level** field and it will fill out correct value for you.

If you look at the XML Data files from the work folder you may see that the text strings look as if they only contain garbage text. You can copy this text, paste it into the Base64 String field, and press **Convert** to see what it actually means.

5.2.5.1 Queue

The Router has a few Queues where it stores all jobs waiting to be processed. Here you can see the status of these queues and if any jobs are waiting there to be processed.
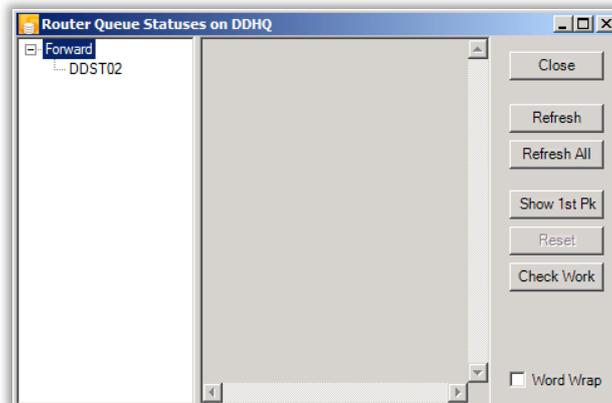
If no Job is waiting, you see a list of available Queues and no data within the queue.
If a Job is waiting in the queue, you will see Host sub queues within the processing queue, and then Job sub queues within the Host queue. Click on either the Host queue or Job queue to see how many packages or jobs are waiting and the overall status of the queue.

RegTime	Last time pack was accessed in the queue.
Offline	If Host is an offline host, the Job will wait until that host connects and collects the jobs waiting to be forwarded to that host.
Error	If there is any error and error message associated with the queue.
Waiting	If the job is doing Database access or being forwarded to the next host, the router waits for a status update on the job process. If the queue gets stuck in processing mode with waiting as true, the queue can be reset by pressing the Reset button.
On Hold	The queue has been put on hold and will not be processed until taken off hold.
Data Cnt	Number of Jobs waiting in the queue.

Select the checkbox Word Wrap to wrap the information text, if a long error message is present.

Refresh button will refresh one queue node and **Refresh All** will refresh all Queues.

Show 1st PK button will pull data from the first job data pack in queue and display info about the job and the host.

Check Work button can be used to reload any ghost jobs that are waiting in the Work folder but for some reason have been lost from the Queue or Job Monitor. **Note:** This should only be used when there are no jobs waiting in Job Monitor and DD is idle as it may override some statues of jobs that are currently in processing.

5.2.5.2 App Status

Behind the scenes, the DD consists of few processes. Each process has a special purpose. To look at the status of each process and see if they are all running or not, check the dialog below:

From here, you can shut down each process and start it up again. They may be useful if one process is stuck or has problem, or if a new update is available for that process, you can shut down one process without interfering with other processes and do the update.

5.2.5.3 Process live debugging

To get a live debugging stream from a process running within Data Director, click on the Open button for the process you want to debug. There are a few processes running behind one Data Director Setup and you can debug every one of them. To be able to connect, you need to have direct access to the host where the DD is running and also be a valid user, because this connection uses only TCPS mode and does go directly to the process socket port, not via general incoming Data port.

Data Director Processes are:

Service	Main Data Director Service application. This is what you have in Windows services and it takes care of keeping other processes alive.
Router	The heart of the Data Director. Takes care of routing jobs to correct DD processes and other DD hosts.
Database	Handles all Database communications.
DD Old	Support for communication with older DD. Converts the old DD2 protocol to the new DD3 protocol and handles all incoming and outgoing data transfer from and to old DD2.
Scheduler	Scheduler Service that process Jobs to be sent to Data Director
Offline	Pulls main DD Host for new jobs and monitors incoming folder for manual transfer jobs.
Backup	Monitor Collection Service that generates jobs with DD Job Data.
WebSrv	Handles LS Nav WS communications.
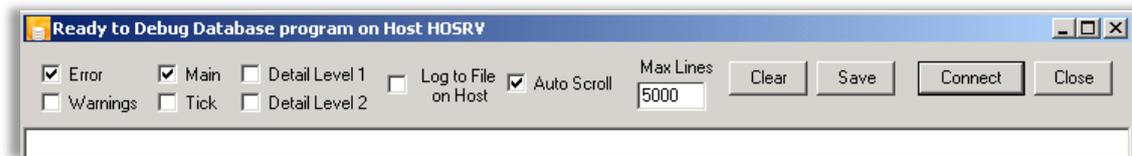
Log to File on Host	This will activate File Debugging on the host where DD is running. If the check mark is left on after you disconnect from the DD Process, debugging will continue logging into the file.
Max Lines	Maximum number of debug lines that Live debugging will show.
Clear	Clear Debug stream window.
Save	Save data in Debug stream window to file on local host. You can also select debug lines from the Debug stream window and press CTRL-C to copy them to clipboard so you can pass them into other applications such as email or notepad.
Connect	Connect to DD Process and start Debugging.

Debug levels are:

Error	Logs all Error Messages.
Warning	Logs Warning Messages, these are errors that are not something that will affect the health of the system.
Main	Logs Main Activity Messages, useful to see what they system is doing.
Tick	Heart beat check. **Note: This generates extreme amount of data and should only be used to check if application is locked up or actually doing something. Never use this for file debug level.**
Detail Level 1	Logs Activity Messages in more Detail, useful to look at to see what they system is doing and provides more detailed information than Main level does.
Detail Level 2	Logs Activity Messages in even more Detail.

NOTE: When debugging Database process and you have CFront mode activated under App Config, you will get 2 or more windows when you press the Debug Database button. The first 2 windows will have port 16803 and 16811. (Depends on what the base port is set to, default it is 16800). 16803 processes is for general database processing for all other databases than the one using CFront. 16811 is for CFront processing and if Data Thread Limit is set to higher value than 1, you will get more windows counting up from 16811. Each of those are for CFront processing and when DD sends job to processing, it will send job round robin between these processes, unless one of them is already busy, but if they are all busy, it start sending to all again.

6   Distribution Location Setup and Ports

Default DD3 uses port 16860 for TCP Communication. If the Location uses default port setup, you only need to enter the host name into the Distribution Server field like before.

6.1   Port and Network Mode Setup

If you need to use some other port or use some other Network modes, you need to set these values in the Distribution Location card for the Host.

Select DD Network Mode. Distribution Server is the host where DD is running and Server Port is what Port DD is using. If DD is using default port then this field can be left blank.

If you are using an LS NAV 6.3 or older, you can still set these values; you need to type them into the Distribution Server name field.

The Format for the data is *<DDSERVICE>:<PORT>:<NETMODE>*.
Sending to the DD Host Store01, on port 18999 using TCP would be *STORE01:18999:TCP*

When sending a Job to DD2, you need to put in *<DDSERVICE>:<PORT>:DDOLD*.
Sending to DD2 Host DDSTORE would be *DDSTORE:16750:DDOLD.*

Below is list of all Network Modes the DD Uses and the Default Port for each of them:

Mode	NetMode	Port	Description
TCP	TCP	16860	Standard TCP
TCPS	TCPS	16850	Secured TCP
DD2	DDOLD	16750	Old Socket Connection for DD2
OFFLINE	OFF		For Pulling host
MANUAL	MAN		For Manual Job Transfer

If the DD host is behind a Firewall, make sure you open up access for both DD3 (16860) & DD2 (16750) ports, or give add DDRouter.exe and DDIncoming.exe to the Firewall allowed programs.

If using IP address for destination hosts, then makes sure the host can reply back to the source host. If the source host name is not known at the destination, you need to add Return IP Address in the Base Config that destination host can use to route the status reply back to the source.

If using IPv6 Address for hosts, then put them inside brackets like this [2001:cdba:0:0:0:0:3257:9652] and if you need to add port or mode with it, the format is like this [2001:cdba:0:0:0:0:3257:9652]:16860:TCP

6.2 Routing via Other DD

The DD also supports the routing of a Job via other DDs. This means that you can send a Job from HO, via a Store DD that sits behind a firewall, and then onward to a POS DD, which the HO does not have direct access to. If all DDs are running on default port setup, you would type into the Distribution Sever field for the POS location: STSRV;POS01. If the DDs are not on the default port, the format is: STSRV:16860:TCP;POS01:16860:TCP.

As mentioned in the Configuration Tool section, a location can have a parent location and in this case a parent location for POS01 is STSRV. When the DD sends a job or any other request to POS01, the Job will first go to STSRV and then be forwarded to POS01.

There is no limit on how many child hosts can be added, just separate the hosts with a semicolon **(;)**   The order of how a job is routed is the same order as the hosts in the list, and the last host is the host that will process the job.

6.3 Routing via backup DD Host

The Data Director supports a backup host for a destination location. What this means is that if a primary destination is down, the job will be routed to a secondary host, which will then process the job. For this setup to work, both destination hosts need to have access to the database that the connection string in the jobs point to.

Format for the Routing setup is: <PRIMARYHOST>%<BACKUPHOST>

In Distribution Location Card, add the backup host to the Distribution Server name with % as separator. You can have more than one backup hosts. If at Head Office you want to have two different computers running DD3 for incoming jobs from Stores, then at the Stores, the Head Office card should include both DD3 hosts at Head Office like this *HODD1%HODD2.*

If a Primary host goes down, the job will be routed to the Backup Host, and from that point, all jobs will go to the Backup Host as long as it stays alive. To Re-Route the jobs back to the Primary Host, stop the Backup Host DD, and jobs will go back to the Primary Host.

If any error occurs on either of the hosts, you can see from which one of them the error comes from by looking at the Error Host value in Job Monitor.

If you are routing jobs via one DD (PASSDD) to another (STDD) and want to have a backup host for both locations, the routing path setup would be like this:

Without Backup Hosts: PASSDD1;STDD1
With Backup Hosts: PASSDD1%PASSDD2;STDD1%STDD2
Dest Host with two backup Hosts: STDD1%STDD2%STDD3

7   Offline & Manual Transfer

DD3 supports Offline stores or Stores that have Dynamic IP Addresses.

7.1 Dynamic IP Setup

Setup for a store that does not have a static IP address or is not connected live to Head Office. With this setup, the store can query HO for new jobs that HO needs to send to the store. If the store is running the Scheduler locally it should always be able to send those jobs to HO.

At the Distribution Location at HO for the store, you need to set the OFF property to the DD Host, so the DD Host looks like this: "STR01:16860:OFF". HO setup at the store can just be a normal setup with the TCP/TCPS Property.

At the store, activate DD the Offline / Pull Support in the Configuration Tool. Enter the HO host name as Pull Host and indicate how often the Store should check for data.

When HO has a Job ready for a Host that has OFF Property, it holds on to the data for that location until a Pull request comes in from the store.

If store is offline for long time, it can fill up Job Monitor with lot of jobs, and slow it down. The Offline host can be changed to Manual destination, and the jobs waiting will be offloaded from the Job Queue and moved to Outgoing folder. Set the Offline to Manual value to set how long DD should wait for Offline host to pull data. Next time Pull request comes in from the Offline host, DD will reload the jobs back in Job queue and they can be pulled again.

7.2 Manual Transfer

Setup for a store that does not have network connection to HO, and all data transfer must go some other way to and from the store, such as by email or USB Sticks.

At the Distribution Location at HO for the store, you need to set the MAN property to the DD Host, so the DD Host looks like this "STR01:16860:MAN". The same goes for the HO setup at the store, it needs the MAN Property also.

Activate the Offline / Pull Support in the Configuration Tool at both locations. Enter the Pull Path field where the DD should look for incoming data files and how often the Store should check for data.

When a job is sent to a MAN location, the data files will be copied to the Outgoing folder where Data Files for the DD are stored. These files should be moved out of the folder when they are transferred over to the destination host. At the destination host, put the files into the incoming folder specified in Pull Path. The DD will then import the files and remove them when the job has been processed. There are two files that need to be transferred, xxxxHEAD.XML & xxxxx-RDAT.ZIP. Both these files need to be put into the Pull Path on the destination host.

Note: The Job Monitor at Source Host will not get any report back for these jobs and will put the status to *Unknown* for the Manual locations. If all destination have been processed either with Done or Unknown, Job will get status Done. The Job Monitor at Destination host shows if the Job was processed or not when the files are imported at the destination.

In Job Monitor, it's possible to see what Manual hosts are waiting for job pickup. Press the **Manual** button to see list of hosts and files waiting for each host. Jobs can be reactive and processed by the source host directly, by pressing **Load TCP** or **Load OFF** button.

When job has been processed at the Manual location, the result is saved to file in the Outgoing folder. This file can be picked up to import at HO to get the status into Monitor Collection database. Activate the ResultDataCollector plugin in Monitor Collection setup to pick up the Result data at HO from the incoming folder.

8 Job Monitoring

This tool listens to all Jobs that are being processed and passed through the DD Service.
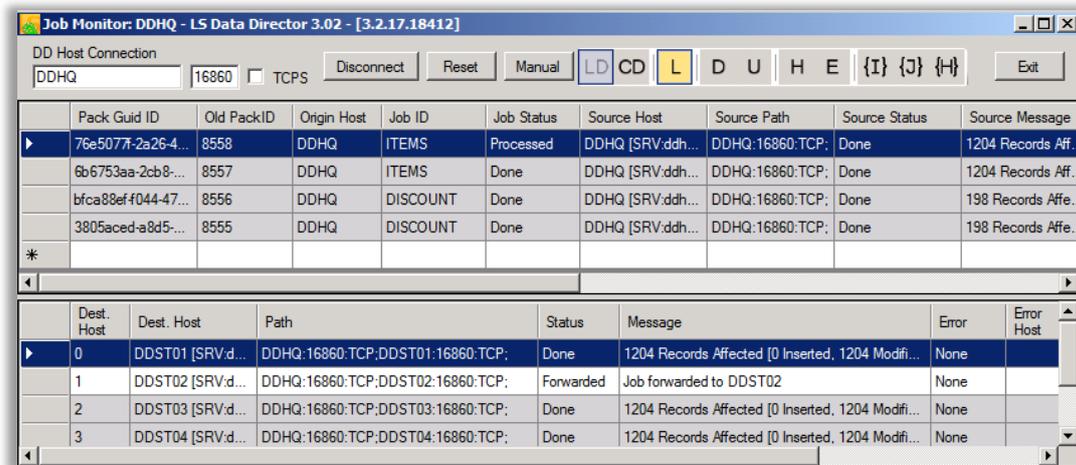
The upper grid shows you Source Processing, and the lower grid shows Destination Processing. Default Job Monitor does not display the Connection string for location, as it may include login information. To enable the Connection string column, you need to edit the **ShowConStr** value to **True** in User Job Monitor Configuration file for each user. File is located at: *\Users\<user>\AppData\Local\LS_Retail\DDJobMonitorxxxxx\3.2.0.0\user.config*

When the program is minimized, it will go down to the Tray area, and the Job Monitor Icon at the tray area will change color depending on its status. If an Error occurs, Icon will change to red color and a window with an error message will pop up (if enabled). If you right click on the Tray Icon, you get a menu:
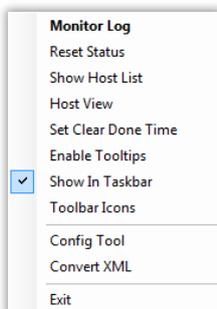
- Monitor Log: Opens up Job Monitor from tray or if its minimized
- Reset Status: Reset Error Icon, same as Reset button in toolbar
- Show Host List: Open or close DD Host List to monitor
- Host View: Switch between Host and Job View
- Set Clear Done Time: Timeout for Done job to clear out of the list
- Enable Tooltips: Show or hide error messages in tooltip box at tray
- Show In Taskbar: Show monitor in Taskbar when minimized
- Toolbar Icons: Show Toolbar with Icons or Letters mode
- Config Tool: Open up DD Configuration Tool
- Convert XML: Converts XML Data file from work folder

Default Job Monitor is set to Job View where you see all jobs by Pack ID. You can also switch to Host View and you will get a view where there is one line by DD host. If there is error, you see latest error and error message from that host.
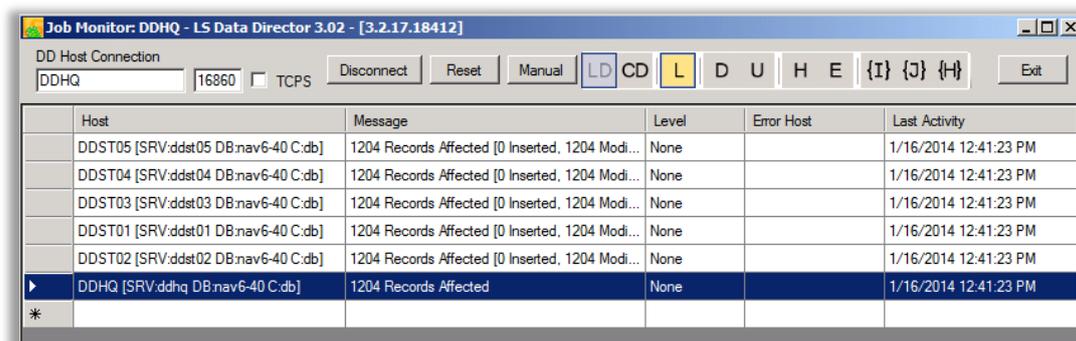
Enter the DD Host name and Port (if not default port) and press the **Connect** button to connect to DD host. You can disconnect from the Host and Clear the List, at any time, by clicking on the **Clear** button in disconnected mode.

If **[LD] Load Done** is selected when you connect, you get all jobs that are stored in DD Router Memory loaded to the grid. The number of jobs you get when you connect is based on the value *Jobs Memory Timeout* that you can find in the Configuration Tool. After that, the grid will update by itself when new jobs come in or a current job status is updated if the **[L] Live** is selected. If you want to stop the live feed, deselect **[L] Live** and the grid will not be updated with the latest Jobs and Statuses. This can be useful if the system is very active and you need to work with the data in the grid, and you do not want it to update all the time.

A Host List can be activated from the Tray Menu to show list of DD Hosts to connect to.
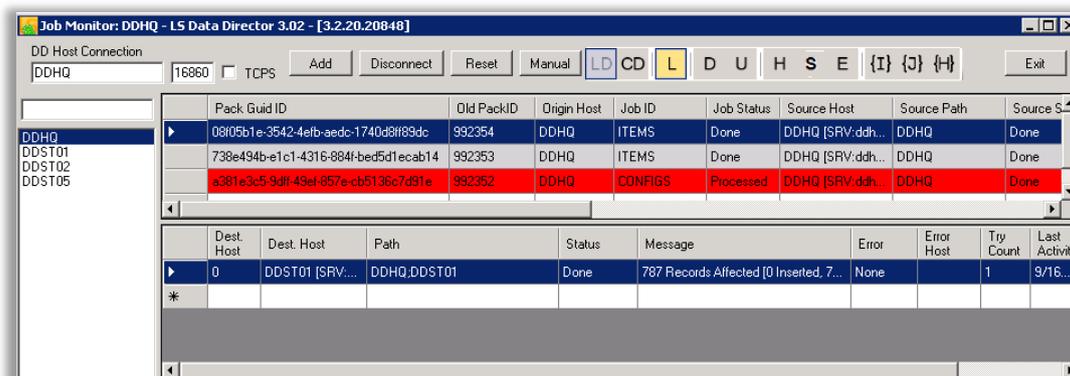
To Add DD Host to the list then type in the DD Host name and port into the connection Host/Port fields and then click **Add** button. To remove Host from the list, select the Host and right click and choose **Remove** from the menu. To Import long list of hosts into the list, right click on the list and choose Import List, select the file to import and press OK. The Host list can also be exported to text file. The format of the host list file is same as for the Configuration tool.

The Host list can be filtered by typing in to the Host filter field above the host list. To connect to DD Host, select Host from the list and press Connect. You need to disconnect from current Host and Clear the list before connecting to next Host. If List is not cleared between hosts, the job data will mix up, only the current host is going to send updated job data. If Job already exists in the Job Monitor from previous DD Host, then the job data will be updated.

You can select more than one job in the source grid when you want to cancel jobs, and can select more than one host in a destination grid when you want to Cancel or put job On Hold.

If a job has an error, the Job Monitor Icon will change color. Green means that you have a connection to the DD Host and no errors have been reported, Red there is job with Error. Press the **Reset** button to reset the Tray Icon back to Green, and when Job is updated and it still has an error, the Tray icon will go back to an error color.

Job source lines will change colors. If a job has Error it will show Red line, so it is easier to find all jobs with Error. If a job has an Error, all jobs with the same job id or destination host will wait and with white line and not turn red, so only the first job will have the red warning color. If a job is On Hold, it will show up in a Yellow-Green Color. Source line color can either be for the Source location or that any of the Destination has Error or is On Hold.

Destination line have same colors as Source line to indicate which destination host has error. Yellow color means warning. Destination can also show Sky blue color which means that status message was not received back from the destination and no update can be found on the job. In that case Monitor on Destination DD has to be checked for job update if it was processed or not. Orange color is used for FOB jobs, if compiling of the FOB object fails, the job will be set as Done, but with warning.

You will notice in the Destination grid that some Hosts have the status **Unknown**. This status is shown, for example, on a POS/Store that is part of a list of POS/Stores that the job was sent to and the DD at that location will never get status update of what is going on at other POS/Stores, only HO or the Host that sent the job would get that update. All other locations will have the status **Unknown**. Also, you will see this status if a job is sent to DD2 or Manual transfer, and it is because DD2 does not send a status report back so DD3 will never know what is going on there.

Toolbar commands are used to control what to monitor and how it's displayed. You can switch between standard Letter version of the toolbar or to the Icon mode in Tray Menu.

[LD] Load Done: Loads all Done Jobs from DD Memory on Connection.

NOTE: If there are lot of jobs in the Memory, it may take long time for the Job Monitor to load everything into the list, so it may be wise to deselect this before Connecting. Any job still to be processed will show up in the monitor next time DD tires to process that job.

[CD] Clear Done: Clears out all Done jobs from the list. Note that if you select this, jobs will not show up again in the grid when you deselect. To see done jobs again, you need to disconnect from the DD Host, Clear the list, and reconnect with **[LD] Load Done** selected. If Done Job Timeout is set to more than 0, then Jobs will not clear out until the Last Activity Time has reached the Clear Timeout.

[L] Live: Live job monitor data feed. If this is deselected, no job updates will happen and any updates till this is activated again will be missed. To reload the list, you have to disconnect and load everything back from DD Memory.

[D] Hide Done: Hides any Done job from the list, so only unprocessed Jobs or Jobs with error will show. To see all Done jobs again, deselect **[D] Hide Done.**

[U] Hide Unknown: Hides any unknown jobs. On a destination host, you may see lines for other destinations with the status Unknown. You can hide these lines. This is useful on destination hosts, to hide destination lines that do not apply to that destination.

[H] Hold Only: Show only Jobs On Hold. Unselected to show all jobs again.

[E] Error Only: Show only Jobs with Error. Unselected to show all jobs again.

[{I}] Find Packid: Look for Job by Pack Guid id. Job will be selected and highlighted.

[{J}] Filter by Jobid: Filter jobs by Job id. This is case sensitive and filters where Jobid contains filter text. To clear the filter, remove filter text.

[{H}] Filter by Source Host: Filter jobs by Source DD Host name. This is case sensitive and filters where Host name contains filter text. To clear the filter, remove filter text.

If you right-click on a job you get a menu. There are different menus depending on if you click on source grid or destination grid.

Retry Now	Retry Now
Cancel Job on Source	Re-Check Status
Cancel Job on all Hosts	Cancel Job on Destination
Put Queue on/off Hold	Put Queue on/off Hold
Put all Hosts On Hold	Copy Field Data
Copy Field Data	View Result DataFile
View Query DataFile	Modify DB String
Modify DB String	Modify Host Path
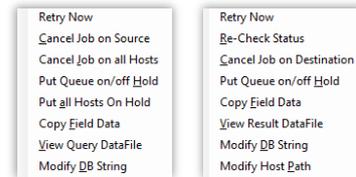
In some commands, like Cancel command and change DB String or Host string, you will be asked "Do you want to cancel/change ALL other jobs too for this locations" or similar question like this. This means that if you click on **All** button, all jobs with same job id and with same Host will also be cancelled. If you click on **This only** button, only the selected job will be cancelled. To cancel the operation, you press **Cancel** button.

Some menu items are same in both grids:

Retry Now: Sends request to DD to retry job processing on selected Host. Default DD retries processing after Error Wait time is up, this overrides that wait.

Cancel Job on Source/Destination: Cancel Job or Jobs on Host if status allows you to do so.

Put Queue on/off Hold: Putting job On Hold, is useful if job is on error because host is offline, you can select to put the job on hold and DD will not try to send the job to the host until the job is released again from on hold. When job is on hold the color of the line will turn into Yellow-Green color. If Max Error Retry count is set, and job reaches Max Count, job will be automatically put on hold, and you care release the job here to let DD retry job processing. You can also set DD to release the job Off Hold after x min.

Copy Field Data: Copy data in current selected Cell.

View Query/Result Datafile: If the job has an error or has not yet been processed, you have the option of looking at the Data files for that job by right-clicking on the grid and select **View xxxx DataFile**. The upper grid shows you the Query file, and the lower grid shows the Result file. The data file will be opened in the default XML Viewer. If the Keep Data Files checkbox is selected in Configuration, then you can also look at the Data Files after the Job has been processed. Make sure to clean up the Data files in Keep Folder when you do not need them any more to free up space.

Modify DB String: Allows you to change the Database Connection string for either the Source or Destination Location. This will update the Connection string for either one job or all jobs of the same type for the same host.

Other menu items are only specific for either source or destination grid:

Cancel Job on all Hosts: Cancel the job on all remaining destination hosts left to process the job, so there is no need to go on each host in the lower grid to cancel each one of them.

Put all Hosts On Hold: Put jobs on all remaining destination hosts left to process the job On Hold. To take jobs Off Hold you need to do so for each Destination host at time.

Re-Check Status: Sends command to DD to check for current status of a job and update Job Monitor.

Modify Host Path: Allows you to change the Destination host or path to Destination host. This is only available for destination lines. Make sure the path string is valid, as wrong data could cause the job to fail or be cancelled.

Job Monitor can show status of Manual job waiting in Outgoing folder. Click on **Manual** button
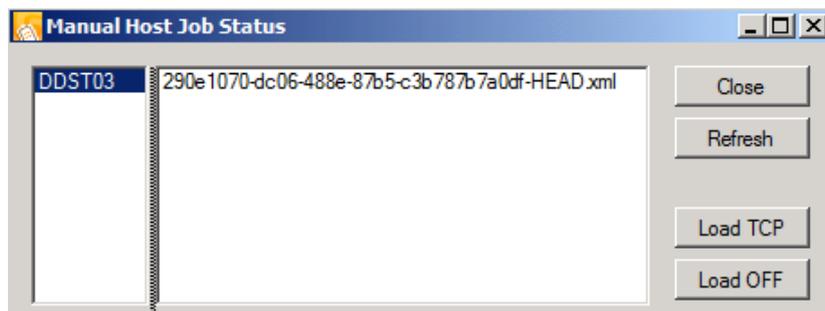
If a host has some jobs in outgoing folder it will show up in the host list. Click on the host to see list of Job header files waiting. **Refresh** button reloads the status from Outgoing folder.

The jobs can be reloaded back into DD Queue for processing if host becomes online. Press Load TCP button to load job for Online replication, and jobs will be sent right away. Press Load OFF button to load jobs as Offline replication, and jobs will go back in to the processing queue and wait for the Offline destination to send in Pull request to pull the jobs.

When Manual Host Job Status dialog is closed, and there are jobs waiting, the Manual button will become green to notify that there are some jobs waiting. Open the dialog again to refresh the status.
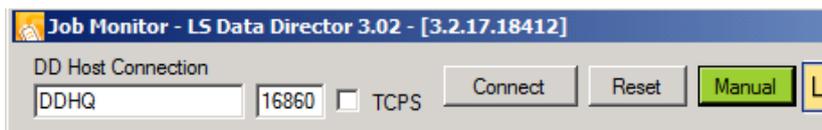
NOTE: If Destination hosts are set to pull jobs from this host (Offline Replication) then there is no need to manually load jobs back to Queue, as this will be done automatically when Offline host comes online again.

NOTE: If Lock Code is set in Configuration Tool, Job Monitor will as for the lock code if commands that change status of a Job Host are excecuted (commands like Cancel Job, Put Job on/off Hold, Change of DB/Host string)

9 Event Viewer

The DD and TransAutomClient control report all errors into Event Viewer under the folder LS Retail Events.
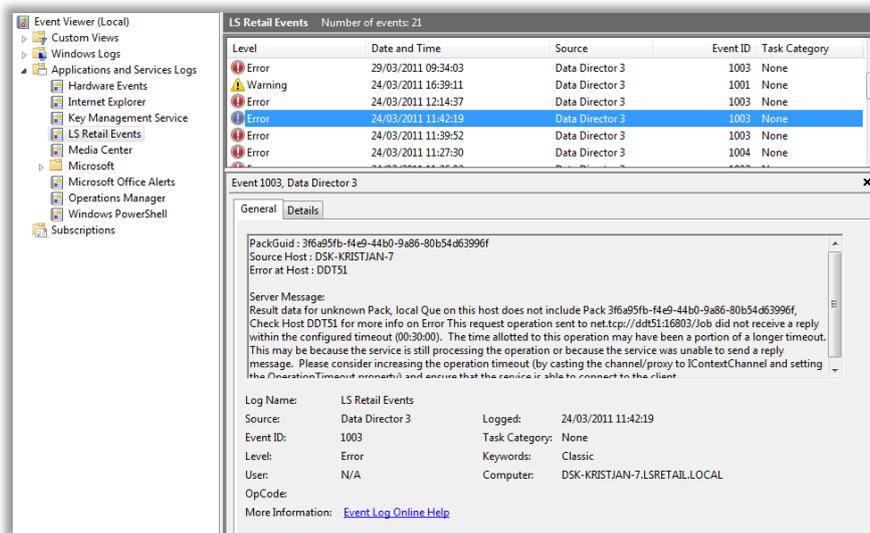
This can be used to collect errors into Monitoring systems like MS System Center or HP Open View. In the Error text are more details about which host the Error comes from, where the job is originally from and its Pack Guid. The DD Event IDs are:

- 1001 – Warning
- 1002 – General Error
- 1003 – Network Connection Error
- 1004 – Database Processing Error
- 9999 – Information message

10 Maintenance

Once installed, the DD servers should require very little maintenance. Nevertheless, there are a few things to bear in mind in order to keep them running smoothly.

- Keep the Dynamics licenses and DD license up-to-date. If the customer wants to add new granules to his license, the license needs to be updated throughout the DD network.
- Monitor the free disk space. The DD stores the packages on the local disk for temporary storage while jobs are in processing. If this space runs out, the DD cannot continue to process new requests.
- Check the status of the Data Folder (see path in Configuration Tool). This is where the DD keeps all Job data files, temporary files and other files it uses for its operation. This folder can grow fast if something is not working as it should.
- Clean up Archive Files. All processed Job files are archived under the Archive path, set in the Configuration Tool. Each data file is not big but this folder can grow in size with the number of files in there, so if a history of jobs are needed, this should be backed up. If not, these files can be deleted. There is setting to set how long DD will store the Archive Files, after that time DD will delete the files Automatically. If you are not interested in keeping any history of processed jobs other than the list that the DD keeps in memory, you can remove the Archive path from the Configuration Tool, and then the DD will delete the Job files when done processing them. Monitor Collection can be set up to move this data to Database.

A. Data Director Connection Strings

This appendix lists several examples of connection strings that you can use in your setup. In most cases it is just a matter of copying the string shown and changing the database name and user and password.

The DD connection string consists of three sections: database-specific connection string, database type and database-specific string. These three parts are separated by the "|" symbol. Each section is configured with parameters that can be different for each database type.

Syntax: <database connection string>|<database type id>|<database specific string>

Supported database types are:

Types	Specific Str	Description
fin	ndbcn@xxx	CFront for Native NAV Database (xxx is version id)
fin	ndbcs@xxx	CFront for SQL NAV Database (xxx is version id)
mssql	none	Microsoft SQL Server Database
mssql	schema=xxx	Microsoft SQL Server Database with different schema name for table than default dbo
ms	navxx	Direct SQL access to NAV SQL Database not using CFront (xx is NAV version id)
navws	none	LS Nav Web Service v1 (GET_TABLE_DATA)
file	none	Export/Import Data to/from file Tab delimited with txt extension
file	xxx@d	Export/Import Data to/from file (xxx is file extension and d is tab delimiter character)
xml	none	Export/Import Data to/from XML file (values as Elements)
xml	attr	Export/Import Data to/from XML file (values as Attributes)
oledb	none	OleDB access to Database
odbc	none	ODBC access to Database
mysql	none	MySQL Database Server
ax	none	Microsoft Dynamic AX 2009 Database
ax	2012	Microsoft Dynamic AX 2012 Database

DD knows how to process connection strings that designed for one type of database and use it to connect to different type of database. F.ex NAV native connection string can be use to connect to SQL database, as DD knows different commands for each item in the connection string.

These are the commands DD understands for connection string item:

Database Server:
```
server, data source, address, network address
```

Database Name:
```
initial catalog, database, dbname, datapath
```

Database User Name:
```
user id, user, uid
```

Database User Password:
```
passwd, password, pwd
```

Database Security Mode:
```
integrated security, trusted_connection
```

Network Library
```
net, network library
```

LS Location id:
```
locationid, id
```

NAV special connection string commands
```
company
nt
```

NAV 2013 Additional Object replication commands for finsql process:
```
navsrv – navservername
navinst – navserverinstance
navport – navservermanagementport
navten – tenant
navsync – synchronizeschemachanges
```

AX special connection string commands:
```
provider
domain
language
cfg
object_server
port
```

For information on how to put together connection string for your database, see http://www.connectionstrings.com/ this site has samples of most common database servers and data providers that are out there.

Following are some examples of connection strings:

Microsoft SQL Server – Standard Connection
Initial Catalog=mydata;Data Source=myserver;User ID=dd;Password=ddpwd;|mssql|none

Microsoft SQL Server – Trusted Connection
Initial Catalog=mydata;Data Source=myserver;Integrated Security=SSPI;|mssql|none

Microsoft SQL Server – Trusted Connection with user login
Initial Catalog=mydata;Data Source=myserver;Integrated Security=SSPI;User=domain\dd;
Password=ddpwd;|mssql|none

Microsoft Dynamics NAV Native Server – Standard Connection
company=mycompany;server=myserver;user=dd;passwd=ddpwd;|fin|ndbcn@602

Microsoft Dynamics NAV SQL Server – Standard Connection
company=mycompany;server=myserver;user=dd;passwd=ddpwd;|fin|ndbcs@602

Microsoft Dynamics NAV SQL Server – Trusted Connection
company=mycompany;server=myserver;|fin|ndbcs@602

Microsoft Dynamics NAV 201x – Standard Connection
company=mycompany;Initial Catalog=mydata;Data Source=myserver;User ID=dd;Password=ddpwd;|ms|nav80

Microsoft Dynamics NAV 201x – Trusted Connection
company=mycompany;Initial Catalog=mydata;Data Source=myserver;Integrated Security=SSPI;|ms|nav80

Microsoft Dynamics NAV 201x – Server Tier/Instance for FOB import
company=mycompany;Initial Catalog=mydata;Data Source=myserver;Integrated
Security=SSPI;navsrv=myserver;navten=mytenant;navport=7045;navinst=myinstance;|ms|nav80

Microsoft Dynamics 365 Business Central – LS Web Service v1
company=mycompany;server=http://myserver:7047/BC130/WS/mycompany/Codeunit/RetailWebServices;user=nav;passwd=navpwd;|navws|none

Microsoft Dynamics AX 2009 – Standard Connection
user=dd;passwd=ddpwd;domain=retail;company=lsr;object_server=LSRetail@server:2713;cfg=;|ax|none

Microsoft Dynamics AX 2009 – Trusted Connection
user=dd;company=lsr;object_server=LSRetail@server:2713;cfg=;|ax|none

OleDB – Standard Connection
Provider=SQLOLEDB;Initial Catalog=mydata;Data Source=myserver;User Id=dd;Password=ddpwd;|oledb|none

ODBC – Standard Connection
Provider=SQLOLEDB;Initial Catalog=mydata;Data Source=myserver;User Id=dd;Password=ddpwd;|odbc|none

Semicomma separated File Import / Export
Database=mydatafolderpath;|file|csv@;

XML File Import / Export
Database=myxmlfolderpath;|xml|none

B. Install Options

Data Director Install can be executed with parameters to make to use of a scripted installation. Details of what options are available can be found here:
http://unattended.sourceforge.net/InnoSetup_Switches_ExitCodes.html

To choose what DD options are installed add /TASKS="xxx" command

- None (not included): Client Files
- **srvfiles**: DD Service
- **clitools**: Client tools
- **cfront**: CFront Files
- **dd2files**: DD2 Client files
- **navcli**: DD Client files for NAV 201x RTC Add-ins
- **navsrv**: DD Client files for NAV 201x SRV Add-ins

To install DD in silent mode and include DD Service and Client files you add these commands: **/VERYSILENT /SUPPRESSMSGBOXES /TASKS="srvfiles,clitools"**

To add path for NAV installation folders, if Nav is installed on Docker, and path cannot be found in the Registry, add **-NAVSRV "<path>" -NAVCLI "<path>"**

It's possible to change default DD Configuration values during installation.
Create ddconfig.xml file with the modified values, put the file into the bin folder where DD will be installed and after installation is done, DD will check for this file before creating the default configuration file, and modify those values from the xml file.

NOTE: this file has to be there before first startup of DD as DD will only look for this file if default configuration values have not yet been created.

Sample of ddconfig.xml file that will set the Alias value and change Decimal fix for Database process to BIG and activate debug.

```
<DDConfig>
  <BaseConfig>
    <Aliases>MyDD</Aliases>
  </BaseConfig>
  <AppConfig>
    <Program Port="3">
      <Debug>15</Debug>
      <Param>
        <DecFix>BIG</DecFix>
      </Param>
    </Program>
  </AppConfig>
</DDConfig>
```

C. Use DDConfigClient DLL in PowerShell Script

DDConfigClient DLL can be used in PowerShell to check status of a job and send commands to DD.

Sample to get Job data for a Job

```
Add-Type -Path 'C:\Program Files (x86)\LS Retail\Data Director 3\bin
\DDConfigClient.dll'
$a = new-object LSRetail.DD.Control.DDConfigClient
$a.GetJobData('ddhost', 'ad577629-3208-42c0-a149-bf385ece2dba')
```

Sample how to get all jobs in Global Queue and check all CONFIG jobs if any are still running. Print out status of the job, when all CONFIG jobs are done, stop the process.

```
Add-Type -Path 'C:\Program Files (x86)\LS Retail\Data Director 3\bin
\DDConfigClient.dll'
$ddClient = New-Object LSRetail.DD.Control.DDConfigClient
do
{
    $complete = $true
    [xml]$ddglobalqueue = $ddclient.GetGlobalQueue("ddhost")

    foreach ($ddchildnode in $ddglobalqueue.GlobalQue.ChildNodes)
    {
        if ($ddchildnode.JobId.StartsWith("CONF"))
        {
            $ddchildnode.JobId + " = " + $ddchildnode.Status
            if ($ddchildnode.Status -ne 'Done')
            {
                $complete = $false
            }
        }
    }
    start-sleep 5
} while ($complete -eq $false)
```

D. Definition of Terms

The following is a list of terms and titles often used in connection with the Data Director along with a brief explanation:

- **DD Service –** This is the server component of the Data Director that keeps all other DD Processes alive and monitors the health of the system. If any process goes down it restarts the process, if possible. The DD Service runs as a service on the host computer.
- **TransAutomClient.dll –** Used by LS Retail for sending queries to the Data Director.
- **Package –** A package contains the data being transferred between the databases. A package has a destination Data Director and a destination database, which can be one or many, depending on how it was created. This essentially represents a unit of work for the Data Director.
- **Host Computer –** The computer running the service part of the Data Director.
- **Source Database/Data** – This is the database that we want to read data from.
- **Destination Database/Data –** This is the database that we want to write data into.
- **Scheduler Database –** This is the Dynamics NAV or LS One Site Manager database that contains all the details regarding tasks that the Data Director should perform (when to send, which tables, which fields etc.). The Data Director log and the Scheduler can also be configured to reside in the same database.
- **Scheduler –** The Scheduler is used for scheduling Data Director Activities at predefined intervals, such as sending sales data to a Head Office database every hour. The Scheduler can be run either in a Dynamics NAV client, Dynamics NAV Application Server (NAS) or DD Scheduler Service.
- **DD –** An acronym for the Data Director.

E. Field Type Mapping

NAV (Native or SQL)	SQL Server
Option	integer
Boolean	bit
Decimal	decimal, float, money, numeric, nreal, smallmoney
Text	varchar (length + 1)
Date	datetime
Time	datetime
Code	varchar (length + 2)
Integer	integer, smallint, tinyint
BLOB	image
BigInteger	bigint
Duration	bigint
DateTime	datetime, smalldatetime
GUID	binary