

This document provides information regarding recommended data management, backup and recovery practices for Waters UNIFI software.

DATA MANAGEMENT BASICS IN UNIFI

What are the data management strategies available within UNIFI?

Please keep in mind that all of the data such as analyses, sample sets, methods and reports are stored in the database. The database consists of multiple files which are stored on the designated hard drive of the system. The database file size on disk will grow automatically as more data is added to the system. The rate that the database size grows is dependent upon the size of the data being acquired in the system. High Resolution MS data can be very large so the database files can grow very rapidly and it can reach a point where there is no more disk space for the database files to grow. In such a situation no more data could be acquired or processed until space is made available in the database. There are two basic strategies available to manage the available space within the UNIFI database; Export and Delete and Offline Storage Management (limited to Network systems). Each strategy requires that the customers follow some simple, practical rules in the configuration of their data hierarchy that are outlined in this document.

What are the elements of a disaster recovery strategy and why do we need this?

The key element of the UNIFI disaster recovery strategy is Oracle database back up. This is a necessary action because if the system were to suffer a catastrophic failure such as a complete computer failure, there is no way to recover from it, unless there is a back up and data would be lost. Waters provides default installation configurations of workstation computers so that a disaster recovery process is enabled and provided when the system is installed. For a network configuration tools and configuration details are provided in the 'UNIFI System Administrator's Guide'.

What tools does Waters provide to manage the Oracle database and perform back-ups?

Waters has released the Waters Database Management tool (WDM) with UNIFI 1.8. This tool is used to manage database files, determine available space and configure Oracle backups.

ADDITIONAL UNIFI BACKUP AND RECOVERY INFORMATION

For detailed information about backup and recovery options for UNIFI, please refer to the following presentations located in Unified Connections (UC), product documentation, and user documentation on the software media.

Sources of additional information:

Resource	Location
UNIFI Backup and Restore.pptx	UC
2015 UNIFI Administration - Waters Database Manager.pptx	UC
UNIFI Installation and Configuration Guide	UNIFI media
UNIFI System Administrator's Guide	UNIFI media

BACKING UP THE UNIFI DATABASE

Do I need to back up my UNIFI database?

Yes! When you install UNIFI, you can select to back up the database using online daily backups or not backup the database. A database backup is critical to system recovery, and should always be selected unless you are installing a system that does not require any recovery such as a Development system, internal training system, or a Waters demo laptop.

How do I configure UNIFI database backups?

When you select the daily online backup option, UNIFI will automatically set up UNIFI database backup jobs with default settings. The installer will also ask for a disk location (Fast Recovery Area) to which the backups will be written. This must be a local drive location with sufficient space (>1.6x the size of the UNIFI database) to store two compressed backups simultaneously.

***NOTE:** Waters demo laptops do not have sufficient storage to support database backups and should not have backup options enabled.*

The backup jobs are created automatically and they are managed within the Waters Database Manager (WDM) application. WDM is a web-based database management tool designed for Waters Informatics products. It complies with our ESL agreement with Oracle. All Oracle Products will eventually utilize this toolset to replace Oracle Enterprise Manager (OEM). WDM is to be incorporated into Empower and NuGenesis in future releases. UNIFI 1.8 is the first product releases with WDM. It is included in base product licensing, so no new licenses are needed.

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WDM is available for both Workstation and Network. There is no difference in operation (except for disk storage), and it provides a consistent approach for managing Waters Informatics products' databases.

What are the default settings for a UNIFI backup?

When you select the daily online backup option, UNIFI will automatically create three database backup jobs; one that will perform a full database backup immediately following the installation, one weekly full backup, and one daily incremental backup.

*By default, the jobs are created with the following settings:
Run time: Full Backup – Monday @ 2:59AM/Incremental – every day @ 3:00AM*

Backup Type: Compressed Backup set

Includes: Datafiles, Archive logs, and control files

Delete Archive Logs: Yes

Delete Obsolete: Yes. Will confirm successful backup, then delete the previous complete backup set.

Backup set section size: 25GB – Maximum size of each backup set file

These settings can be modified (with caution) by logging into Waters Database Manager, clicking the Server icon, selecting the Backups tab, then clicking the Scheduled Backups item.

It is recommended to copy or backup the backup sets written to the Fast Recovery Area daily after the completion of each backup job. See the UNIFI System Administrator's Guide for details.

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UNIFI Installation and Configuration Guide	UNIFI media and waters.com
UNIFI System Administrator's Guide	UNIFI media and waters.com

DATA MANAGEMENT STRATEGIES

How should I organize my data hierarchy to ensure that a simple and effective data management strategy can be adopted?

Waters recommends that customers set up the data hierarchy such that folders and sub-folders are created that contain ALL of the data that logically relates to a given body of work. A body of work might be a study that contains multiple folders that are named for parts of the study. It might also be based on work that is done in a given month. The point is that folders and their sub-folders are considered to be the container of all related data that would be subjected to either data management strategy. We recommend that the user refrain from making copies or new analyses based on sample sets or analyses, into folders outside of the folders or sub-folders included in the container.

The reason for these recommendations is threefold. Waters has designed the UNIFI database such that it does not create unnecessary copies of data elements so as to provide the minimum database file usage. The second reason is that Waters provides tools used for regulatory reviews and audits that allow the user to “Find Related Data”, particularly reports, results and sample data (raw data). This is provided via database relationships. To maintain these relationships and ensure the most efficient re-use of the database file capacity all related items should be managed together. Lastly, this is an easy convention that can be used in the future to locate and restore this data when needed.

Export/Delete Strategy

The Export and Delete Strategy is the recommended strategy for data management of UNIFI Workstations. The basis of this strategy is to select folders from Unifi>Explorer to be exported as a UNIFI export package (.UEP) file which are then stored in a file location that must be managed and subjected to a disaster recovery strategy that is typically managed by the customers IT or MIS department.

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Protection and the ability to find these files are critical because the next action is to select those folders in the UNIFI>Access Management page and then delete those folders and all of their items from the UNIFI database. Assuming that all related items are within the selected folders, the file capacity in the database files that is roughly equivalent to the size of the exported file will be made available for re-use. If all of the related items are not in the exported folder(s) then some of the space may not be made available because the referenced items still remain in the database.

In the event that the user wishes to restore the data into the UNIFI system they import the export file and this will re-establish all of the previous relationships and will occupy the same database file capacity.

What is Offline Storage Manager, and should I use it?

Offline Storage is an available data management strategy for UNIFI Network installations. Offline Storage Manager (OSM) is a function within UNIFI that provides the capability to move data items from the UNIFI database to an external storage location. This location must be accessible through the network in order to move data out of the database or restore data back to the database for use within the application. It is critical this location is available at all times for proper application operation. Due to the implementation of OSM within all current UNIFI version (<=1.8 SR1), OSM should be used with care and it is important that the data hierarchy be managed as described in the “Practical considerations to ensure effective data management strategies” and that the OSM policies are set to manage these folders the same way when the customers believe that the container is ready for application of the OSM policy.

For detailed information on OSM configuration, please refer to the following presentations in Unified Communications: [UNIFI Data LifeCycle Management and Analytical Relationships.pptx](#), [UNIFI Offline Storage Manager.pptx](#). See the UNIFI online help for additional detail on setting up OSM.

DATA MANAGEMENT FOR WORKSTATION

How should I install and configure a UNIFI Workstation's storage to properly manage data?

The information provided below is based on the currently shipping UNIFI Workstation (Lenovo C30-1136) provided by Waters. If the customer provides their own hardware, this configuration should be emulated as much as possible.

The UNIFI Workstation (C30-1136) comes with the following hard disk equipment:

2x 4TB SATA

1x 6TB SATA

1x 256GB M.2-SATA SSD

These hard drives are used in the following manner; please use the partitions as described:

1x 256GB M2.SATA – Windows Operating System and UNIFI Temp location - (C:\)

2x 4TB SATA – 1x RAID1 Pair - UNIFI Application & Database - (E:\)

1x 6TB SATA – Oracle Fast Recovery Area (FRA)- (F:\)

Optional Network Storage Array – This is an external storage unit that can be purchased from Waters to provide additional storage to a UNIFI Workstation. This device is intended to be used only for the storage of UNIFI export files in conjunction with the proposed data management strategy.

12x 6TB SATA – 11x RAID6 + 1x Hot Spare (54TB usable)

Requires additional RAID Controller Adapter

Can I use Offline Storage Manager (OSM) with a UNIFI Workstation?

OSM should not be used with a UNIFI Workstation. The nature of a UNIFI Workstation lends to it not being tightly controlled and monitored by a customer's IT organization. This can result in unreliable availability of the location defined in the OSM configuration. As a result, this feature may be discontinued completely in future versions. Please refer to the outlined strategy of managing space by exporting and deleting UNIFI data folders to properly manage database storage.

What is the Add a Drive feature in Workstation, and should I use it?

The "Add a Drive" feature should only be used for disk drives that are installed internally on the workstation. It should NEVER be used with external USB drives because if that external drive is not operational 100% of the time that UNIFI is running the UNIFI system will suffer an un-recoverable catastrophic failure. If your system is running low on space, please use one of the Data management strategies discussed above. We will be removing this feature in an upcoming UNIFI release.

ADDITIONAL UNIFI WORKSTATION INFORMATION

For detailed information about UNIFI Workstation installation, please refer to the following presentations located in Unified Connections (UC), product documentation, and user documentation on the software media.

Sources of additional information:

Resource	Location
InstallAndConfig - Part1 - Installs.pptx	UC
Oracle ASM, UNIFI Disk Expansion and Raw Table Capacity.pptx	UC
Install and Config - Part 2 - Upgrades.pptx	UC
UNIFI Software Migration and Upgrade Paths.pptx	UC
UNIFI Computer Hardware.pptx	UC
UNIFI Backup and Restore.pptx	UNIFI media
UNIFI Installation and Configuration Guide	UNIFI media
UNIFI System Administrator's Guide	UNIFI media

DATA MANAGEMENT FOR NETWORK

How should I install and configure a UNIFI Network Application Server's storage to properly manage data?

The information provided below is based on the currently shipping UNIFI Network Server v3 (TD350) provided by Waters. If the customer provides their own hardware, this configuration should be emulated as much as possible. The UNIFI Network Server v3 comes with the following hard disk equipment:

- 32x 1.8TB SAS
- 2x 32GB SD
- 2x 120GB M2.SATA

These hard drives are used in the following manner; please use the partitions as described:

- 2 x 120GB M2.SATA – 1x RAID1 Pair - Windows Operating System and UNIFI Temp location - (C:\)
- 1x 1.8TB SAS – UNIFI Application - (M:\)
- 14x 1.8TB SAS – 7x RAID1 Pairs - UNIFI Data (Oracle ASM Data Group and Database)
- 15x 1.8TB SAS – RAID6 – Oracle Fast Recovery Area (FRA)- (F:\)
- 2x 1.8TB SAS – Hot Spares
- 2 x 32GB SD – Bootable restore image files and BIOS Load

Oracle Database Storage - UNIFI Network utilizes an Oracle feature called Automatic Storage Management (ASM) to manage the storage allocated to the Oracle database.

Oracle ASM uses disk groups to store data files; an Oracle ASM disk group is a collection of disks that Oracle ASM manages as a unit. Within a disk group, Oracle ASM exposes a file system interface for Oracle database files. The content of files that are stored in a disk group is evenly distributed to eliminate hot spots and to provide uniform performance across the disks.

ADDITIONAL UNIFI NETWORK INFORMATION

For detailed information about UNIFI Network installation, please refer to the following files located in Unified Connections (UC), product documentation, and user documentation on the software media.

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Oracle Backup Storage – In UNIFI 1.8, the installation was changed to no longer store backup sets in an ASM-controlled disk location. You must now provide a Windows disk location (F:\) to store the database archived log files and backup sets. This location is called the Oracle Fast Recovery Area.

Optional Network Storage Array – This is an external storage unit that can be purchased from Waters to provide additional storage to a UNIFI Network Server. This device is intended to be used only for Offline Storage Manager, Database Backups, or the storage of UNIFI export files in conjunction with the proposed data management strategy.

- 12x 6TB SATA – 11x RAID6 + 1x Hot Spare (54TB usable)
- Requires additional RAID Controller Adapter

Can I use Offline Storage Manager (OSM) with a UNIFI Network? Yes; however, due to the implementation of OSM within all current UNIFI version (<=1.8 SR1), OSM should be used with care and it is important that the data hierarchy be managed as described in the “Practical considerations to ensure effective data management” section above.

Changes to OSM are planned for UNIFI 1.8 SR2 that will make this much simpler, and more effective. Until that time, OSM should only be used when necessary and only when the impact is understood.

For detailed information on OSM configuration, please refer to the following presentations in Unified Communications: [UNIFI Data LifeCycle Management and Analytical Relationships.pptx](#), [UNIFI Offline Storage Manager.ppx](#). See the UNIFI online help for additional detail on setting up OSM.

Sources of additional information:

Resource	Location
InstallAndConfig – Part 1 - Installs.pptx	UC
Oracle ASM, UNIFI Disk Expansion and Raw Table Capacity.pptx	UC
Install and Config - Part 2 - Upgrades.pptx	UC
UNIFI Software Migration and Upgrade Paths.pptx	UC
UNIFI Computer Hardware.pptx	UC
UNIFI Network Server Hardware Redundancy.pptx	UC
UNIFI Backup and Restore.pptx	UNIFI media
UNIFI Installation and Configuration Guide	UNIFI media
UNIFI System Administrator's Guide	UNIFI media