

Connectivity: Linking Freezerworks Data with Other Databases

The heavy demands on today's laboratories and repositories require them to increasingly rely on technology. Funds are limited, so technology investments must be critically assessed. Once a commitment is made to a software product, purchasers often feel compelled to remain with that manufacturer's suite of products to minimize compatibility issues. Yet users should be able to choose the best software for the job, regardless of the manufacturer. The challenge becomes how to connect the diverse technology together so data can be shared.

Connectivity in Laboratories

Dataworks customers want the ability to move data between Freezerworks and other data sources. This may mean sharing data between a copy of Freezerworks in Miami and a copy in Seattle, or moving data back and forth between Freezerworks and a dissimilar database at the same location. Still other sites need to interact with simple lists of data from spreadsheets or text files. To meet all of these needs, Freezerworks streamlines data access and data transfer while maintaining integrity by electronically exchanging data with other programs.

Moving Data between Freezerworks and Other Data Sources

There are currently two methods for linking Freezerworks data with other data sources. The simplest way to share data between two sources is to export the information out of one application, and then separately import the information into another data source. Freezerworks provides powerful Export and Import options to assist with this. The shared data can travel from one application to another simply by copying the data file onto a diskette, CD, FTP site or internally on a PC.

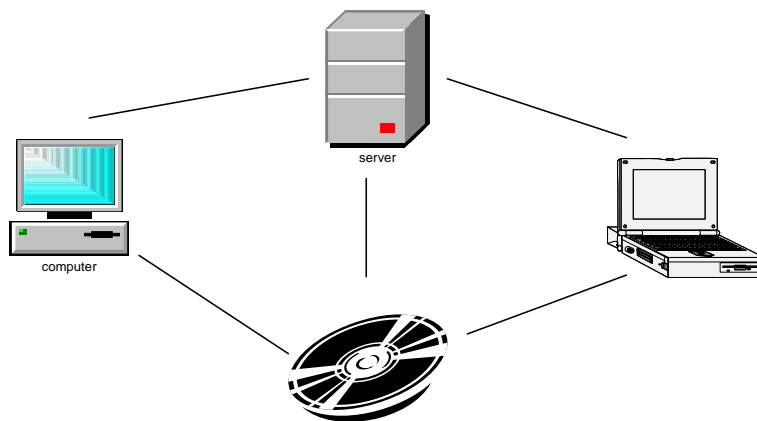


Figure 1 – Simple Export and Import

The more advanced method allows the user to connect other databases to Freezerworks using tools bundled into the application. These features save sites the cost of hiring a developer to perform routine data transfer duties.

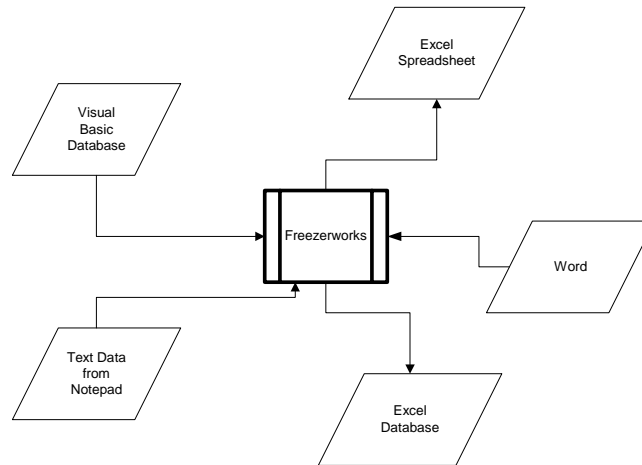


Figure 2 – Advanced Export and Import

Exporting Data from Freezerworks to Other Databases

To send Freezerworks data to another copy of Freezerworks or to a different application entirely, simply use the Export Option. This option will create a data file that can be imported into the desired application.

Specifically, data is sent to an ASCII formatted text document, according to file specifications established by the user. Users can choose the data fields they need in their export file, and also the special characters needed for field and record delimiters. As with the import feature, export format names can be saved for regular use.

Importing Data into Freezerworks from Other Data Sources

Freezerworks can easily import sample and/or aliquot data from other data sources, including other copies of Freezerworks, as long as that data is represented in an ASCII text file. Data originating in other applications (e.g. Microsoft Word™ documents or Excel™ spreadsheets) must be saved as a Comma Separated Value file (.CSV) or a text file (.TXT) before importing.

Once a data file is established for import, users tell Freezerworks how to handle each piece of data via field mapping. Users are encouraged to store the details of each data import in saved formats. If data is imported on a regular basis, these saved formats will identify how the data should be processed saving valuable time.

While importing, Freezerworks performs a range of data integrity checks before allowing information to be saved in Freezerworks. Users determine what should be done with data

that does not conform to the current field requirements. Upon completion, an error report is printed allowing users to review any problem data that did not import.

ODBC Driver for Freezerworks Servers

This module is available in Freezerworks Client/Server versions only. ODBC (Open Database Connectivity) is a standard database interface allowing access to a given data source from any client application. Freezerworks' ODBC Driver acts as a translator between Freezerworks and many types of applications (word-processors, spreadsheets, report generators, etc.). These Windows™ applications may execute ODBC calls and SQL (Structured Query Language) commands, as well as standard operations such as printing mail merge letters, generating reports, and displaying data in the client application or database. The driver transforms the Freezerworks server into an ODBC data source.



Figure 3 – ODBC Driver links and translates

NOTE: While a Freezerworks server in Mac™ OS or Windows™ may be designated as the ODBC data source, the client application can run only in Windows.

To use ODBC with Freezerworks:

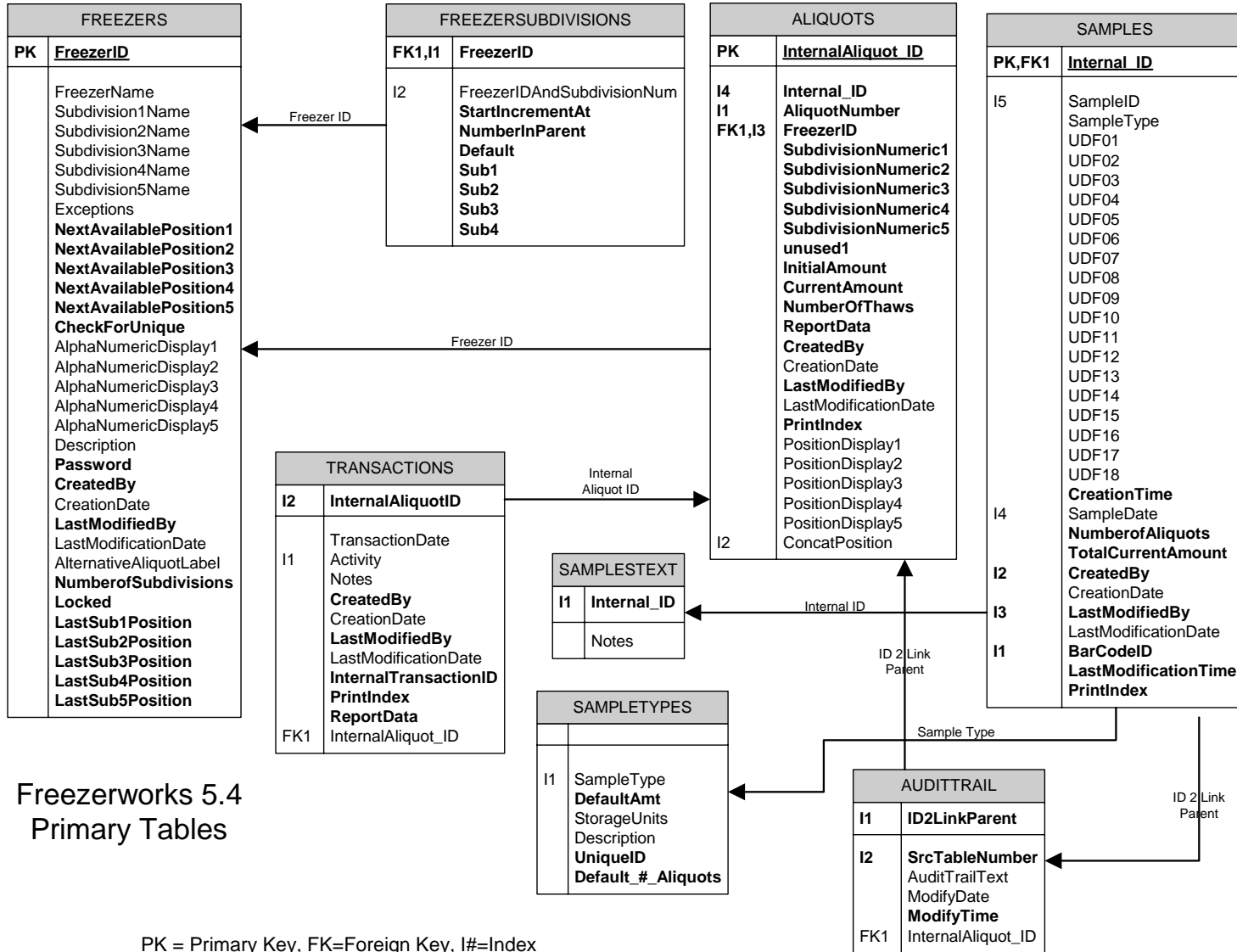
- Install the ODBC Driver for Freezerworks on the server.
- Activate the Freezerworks Server from the client.
 - Define settings for the ODBC Data Source Administrator. Go to Start-Settings-Control Panel-Administrative Tools-Data Sources (ODBC). The ODBC architecture is based on applications that use one or several data sources. These data sources must be defined and qualified on the client in order to gain access to the right one.
 - Set the System DSN. Select the appropriate tab and “add” the ODBC Driver for 4D Server.
 - Assign a Data Source Name to be associated with Freezerworks (e.g. F5_ODBC)
 - Setting the Network Path should bring up the 4D Network Component dialog box that comes up when you use Freezerworks Client. Select the data file as you normally do.
 - Choose the Test Data Source button and confirm you get the message: “Connection Succeeded!”
 - Be sure to save your changes.
- Client Application: create a query

- By selecting a data source (Freezerworks) in the client application, users can create a new query, or execute an existing query that was saved earlier.
 - For example, in Microsoft Excel users will select Data-Get External Data-new Database Query. By saving F5_ODBC (as in the above example) for the Data Source Name, Excel is now connected to Freezerwork data.
 - Many applications offer Query Wizards to help with this step.
- Client Application: execute a query
 - Upon executing a saved query, a connection window will appear in the client application. Data will be loaded into the client application accordingly.
 - Freezerworks allows only *read* capability to applications accessing the database via the ODBC Driver. Due to stringent data integrity checks within Freezerworks, *writing* or *manipulating* data is not allowed. The powerful import feature in Freezerwork is available for this purpose.

Database Structure of Freezerworks

The following is a simple model of the relational table structure within Freezerworks. More detailed table structures are available for customers purchasing the Client/Server version of Freezerworks with the ODBC Driver for 4D Server.

Relations between data tables in Freezerworks Basic



Freezerworks 5.4
Primary Tables

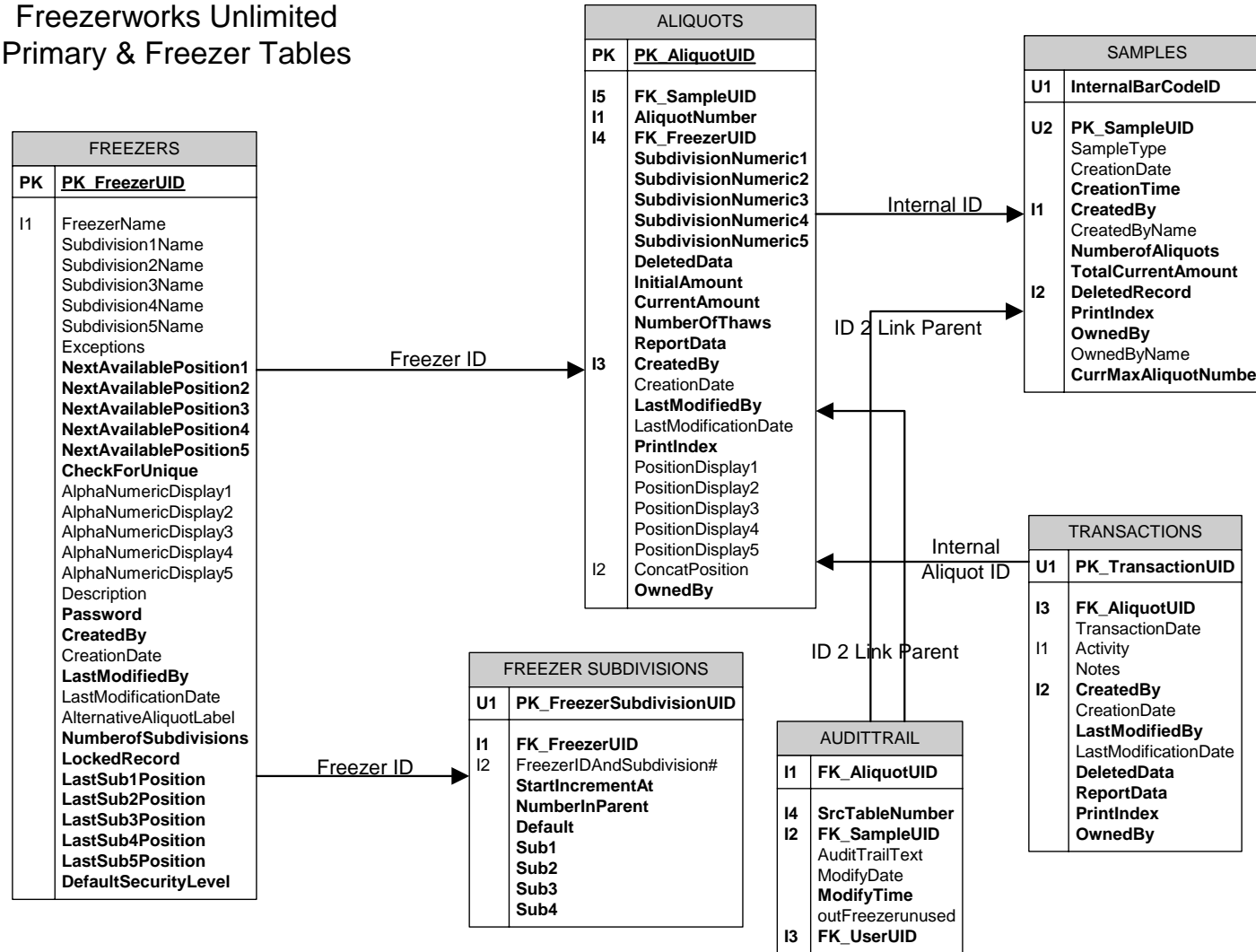
PK = Primary Key, FK=Foreign Key, I#=Index

The parent record in the Samples table has related children in the Aliquot and Audit Trail tables. Records in the Aliquot table have child records in the Transactions table as well as the Audit Trail (grandchildren of the Sample).

Aliquot records are assigned freezer locations by a lookup into the Freezers table for assignable positions. Searches throughout the Aliquots table keep unique freezer positions from being assigned.

Relations between Primary/Freezer data tables in Freezerworks Unlimited (versions 4 and earlier)

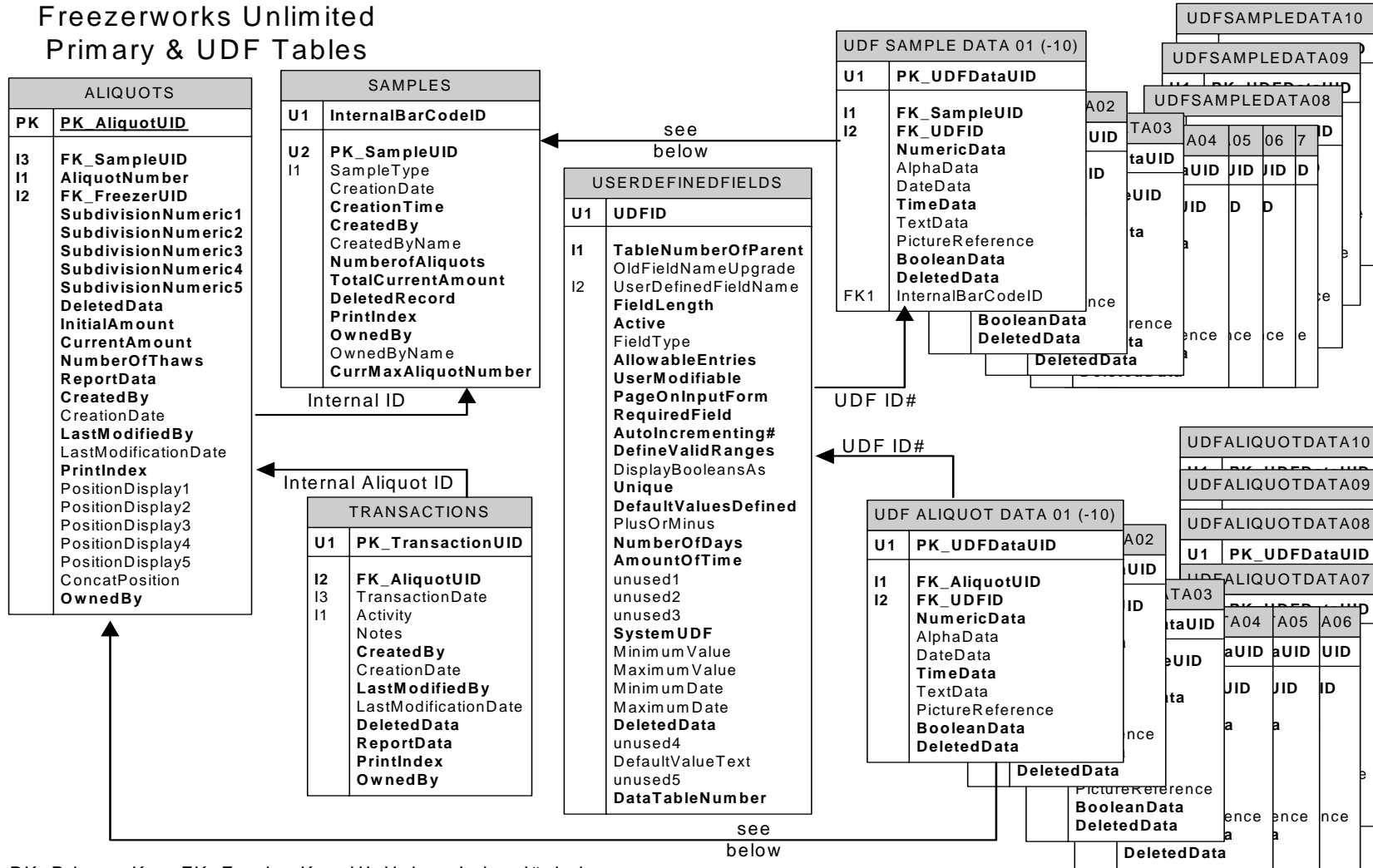
Freezerworks Unlimited
Primary & Freezer Tables



PK=Primary Key, FK=Foreign Key, UI=Unique Index, I#=Index

Relations between Primary/User Defined Fields data tables in Freezerworks Unlimited (versions 4 and earlier)

Freezerworks Unlimited Primary & UDF Tables



UDF: User Defined Field

Users are allowed to define up to 2000 User Defined Fields associated with their either sample or aliquot data. There are ten UDF tables linked to the sample table, and ten to the aliquot table. When UDF's are created, their attributes are assigned sequentially to the ten linked UDF tables. The eleventh created UDF is

stored in the first table and the cycle repeats. This allows for more even data distribution for maximum database performance. **Note: Version 5 of Freezerworks Unlimited no longer uses the linked UDF tables and instead places the UDF data directly in the Sample or Aliquot table.**

Web Services Module

In 2005 Dataworks Development, Inc. released the Web Services Module for Freezerworks Unlimited. It is available for Stand Alone or Client/Server versions. Freezerworks Unlimited supports SOAP (Simple Object Access Protocol), which uses XML (eXtensible Markup Language) to handle the data. Web services allow a Freezerworks data to be published over the Internet. Users from heterogeneous systems can use it to access the database through the web without extensive system networking.

A typical scenario might involve a professor traveling to Bermuda for a microbiological conference. She receives a message from her laboratory in Cleveland letting her know that they have just received, stored and recorded an extra 2000 patient samples. The professor realizes the data she plans to present at tomorrow's meetings will be skewed if she doesn't have all of the latest information. At the laboratory, using Freezerworks Unlimited, the lab's system administrator has prepared and saved several data queries earlier using the new Web Services module. These Web Services queries allow the professor to obtain the data she needs, even though the staff has gone home for the evening. Using her laptop, the professor accesses her lab's database over the internet. After her login and password has been confirmed, she is able to choose the Freezerworks query prepared by the system administrator. She enters the date range selection required by the query and is then given all of the current information on the 2000 samples and their aliquots stored in the database. The professor downloads the data to her laptop and prepares for her presentation.

The Freezerworks SOAP Server module allows both read and write access to the database, while utilizing all the built in security features (e.g., Users and Groups) of Freezerworks Unlimited.

Document updated 5/4/2010 by Rick Michels