Release Notes **Centura Team Developer 2.1**

New Features in Centura Team Developer 2.1

Performance
With CTD 2.1 there is a significant improvement in runtime performance. CTD 2.1 runs up to three times faster than CTD 2.0.

ActiveX/COM support
- The method IsDispatchValid has been added to the "Object" class of AUTOMATION.APL. This is intended to verify that a specific UDV reference is associated with a valid Automation Interface (IDispatch), at runtime.
- The methods GetBlob and SetBlob have been added to the "Variant" class to facilitate the storage and retrieval of Binary data in Variants.
- Methods have been added to the "SafeArray" class to support the storage and retrieval of Boolean data types (GetBoolean, PutBoolean, GetBoolean2D, PutBoolean2D, GetBooleanMD, and PutBooleanMD.)
- The event handling capability has been improved, along with additional parameter data type support.
- Stability of the product has been much improved, especially in the area of use of ActiveX controls, both at design time and runtime.

SAL CDK
Methods have been added to the cdkApplication class to facilitate manipulating Global Named Menus (AddNamedMenu, RemoveNamedMenu, GetNamedMenu, EnumNamedMenus, and EnumNamedMenuObjects.)

Visual Toolchest
The message constant VTM_LVColumnClick has been added. This message can be trapped in a cListView or cListViewDropDown Window Object to facilitate awareness, at runtime, of user initiated sorts. wParam is FALSE indicating the sort order is changing to Descending, and TRUE indicating the sort order is changing to Ascending. lParam is the column number that has been clicked (the first column is zero.) See the sample vttest.app for a demonstration.

Centura Web Extensions
WebPutHTTPHeader
This function has been added to facilitate the "putting" of Headers. Its usage is as follows:

```
bOK = WebPutHTTPHeader( sHeader, sValue )
Returns
       Boolean:
Parameters
       String: sHeader
       String: sValue
```

Call to put the value of a HTTP Header. Returns TRUE if successful.

XML
The function GetXMLAttributes has been added to the classes cWebXMLTable, cWebListBox, and cWebComboBox. This function allows programmatic setting of the character set of XML documents. This function is called late-bound during the XML generation of XML Lists and Tables.

Javascript
- The query string in an HTTP GET is restricted to approximately 1024 bytes. Therefore the implementation of CWEXMLGetXMLDoc determines the length and performs an HTTP GET if it is less than 1024 bytes. Alternatively it performs an HTTP POST if the query string is greater than 1024.
- Two new Javascript methods have been added for increased flexibility. CWEXMLGetXMLDocWithGet has the same parameter signature as CWEXMLGetXMLDoc but always utilizes an HTTP GET. CWEXMLGetXMLDocWithPost has the same parameter signature as CWEXMLGetXMLDoc but always utilizes an HTTP POST.

HTML

The Cascading Style Sheets created with WEBPAGE_GENVERSION2 are now W3C compliant and will render appropriately on Microsoft Internet Explorer 5.x (or newer) and Netscape 6.2 (or newer.)

Debugging CTD COM Objects used by ASP applications

COM debugging requires careful configuration of your operating system and web server. For detailed steps refer to "Windows Configuration for CTD Web Development Machines" on Gupta's web site at http://www.guptaworldwide.com/tech/support/whitepapers/ctd/default.asp

New Features in Centura Team Developer 2.0

The new features of the prior version, 2.0, are summarized in the Help topic 'New Features', and are also listed here. Please see the Help and the Books Online for more details.

COM Server Generation

- This release of Centura Team Developer allows you to generate WinDNA compliant COM servers. To learn more about COM server support, read chapter 20 of the Developing with SQLWindows book. The following specific features related to COM server generation are now part of the product:
- COM wizard: The COM wizard lets you generate CoClasses and corresponding Interfaces, with optional generation of MTS related classes, or independent Interface classes for use with existing CoClasses in COM Servers.
- COM server support: You can write COM automation servers with SQLWindows and create non-visual business objects. Automation Servers developed with SQLWindows are compatible with MTS and can be added to MTS Packages (on Windows NT 4) and COM+ Applications (on Windows 2000).

Threading Support

SQLWindows supports threading in both EXE and DLL COM servers. CTD manages all threading issues including thread creation (for *.EXE servers), synchronization, thread local storage, and deadlock. Thread control functions are not exposed in SAL.

Web Application Development

This release includes these new features for Smart Web Clients. These features include enhanced support for building both stateless and dedicated applications, improved UI capabilities (including XML generation and the ability to write WML applications) and a re-architected application server.

Enhanced Object Oriented Programming

The existing Object Oriented features of the SAL language have been augmented by dynamic instantiation (including a 'new' operator), object destructors, and the pseudo variable 'this'. The 'new' operator has become a reserved word. However, 'this' is not a reserved word, and a variable can be declared with the name 'this' (in which case, the use of 'this' within that scope will resolve to the variable rather than the self-reference that might otherwise be the case). 'this' can be used outside the scope of a functional class, in which case it does not hide anything. The function name "ObjectDestructor" is reserved for class destructor code, and cannot be used for any other purpose.

Miscellaneous New Features

- ADO Support: Centura Team Developer is an OLE DB consumer that can work with any OLE DB provider to access both relational databases and non-relational data sources. The OLE DB providers require Microsoft Data Access Components (MDAC) 2.6, and the English version of this is installed when you choose to install either the SQLRouter for ODBC, SQLBase ODBC Driver, or SQLBase OLE DB Provider. Other language versions are available for free download from the Microsoft Web site at http://www.microsoft.com/data/
- Multi-connection transactions: Multiple database connections can now be made in a single application by using the newly introduced Session Handle data type.

- ActiveX Explorer: A new programmer's productivity aid for use with ActiveX controls and COM servers.

Migration Notes

There are several important changes in functionality between CTD version 1.5 and CTD version 2.x. Some of these changes may require you to make modifications to your code, particularly in the areas of COM and ActiveX, and particularly if you have done extended or customized work in these areas. A summary of these changes is included in these notes. You can find useful documents fully describing the COM and ActiveX changes, and describing the modifications you need to make, on Gupta's web site at the following web address:
http://www.guptaworldwide.com/tech/support/bulletins/ctd/default.asp
In addition, Gupta engineers have written white papers that can help you configure Windows and Internet Information Server to work more effectively in debugging CTD COM servers and deploying those servers in Active Server Pages (ASP) environments. You can find those white papers on Gupta's web site at the following web address:
http://www.guptaworldwide.com/tech/support/whitepapers/ctd/default.asp

Centura.h

- SalTimerSet parameter definition changed from WORD to INT. This may cause compile warnings or errors for applications linking to CBDLL.LIB.
- SWinMDArrayDateType has been removed and SWinMDArrayDataType has been added. SWinMDArrayDateType was actually a typographic error, as well as having an incorrect signature for its intended SWinMDArrayDataType. This function is now functional.

Installation

The installer now places CSTRUCT.APL in the Centura program folder instead of the Samples subfolder.

Centura Web Extensions

In the HTML Generation Process the Late-bound function SaveState is called before the "Rendering" process of Child Window Objects. This was changed to accommodate migration of 1.5 Web applications to 2.x, but may present an issue for 2.0 applications migrated to 2.1.

ActiveX

The format of COM proxy libraries (APLs in the AXLIBS folder) has changed since Centura Team Developer 1.5. You should regenerate any of these that you require in applications working with CTD 2.x.

Steps for Migration of CTD 1.5 ActiveX applications

The numbered list below is only a summary of the steps. For more detailed information refer to paper "Migrating from CTD 1.5 to 2.x: ActiveX and COM Issues" on Gupta's web site at http://www.guptaworldwide.com/tech/support/bulletins/ctd/default.asp.

1. 1.5 ActiveX libraries need to be removed.
2. ActiveX libraries need to be "regenerated" with the ActiveX Explorer.
3. Some class definitions need to be changed from Functional Classes to COM Proxy Classes. This applies to all classes that in 1.5 were Functional Classes and were derived from ActiveX Functional Classes, and now the equivalent ActiveX parent class in 2.x is a COM Proxy Class.
4. All instances of Functional Classes that are now instances of COM Proxy Classes need to be removed and added back to the outline. (This causes the correct 2.x outline item type, COM Proxy, to be used instead of Functional Class as in CTD 1.5.)
5. All Calls made to Init() of a COM Proxy need to be changed to Create().
6. Any object name that is now longer than 32 characters needs to be accounted for. Prior to CTD 2.0 object names (variable names, function names, class names, etc) were limited to 32 characters
7. All Enumerations need to have their name changed appropriately, as the naming convention

differs between CTD 1.5 and CTD 2.x.

8. All ActiveX Window Objects need to have their name changed appropriately, as the naming convention differs between CTD 1.5 and CTD 2.x.

COM Events

COM clients that handle events now show the specific numeric type for event numeric parameters. A client application created under an earlier version of CTD may not show the specific numeric types for these parameters, however. The workaround for this is to go into "Message Actions" for the COM proxy class derived from the COM proxy class where the events are defined, then delete and re-enter the Message Actions of interest.

QuickOLE

The QuickOle interface has been deprecated and is not part of CTD 2.1. For detailed instructions for migrating QuickOle containers to ActiveX containers refer to http://www.guptaworldwide.com/tech/support/bulletins/ctd/051101.asp.

Data Fields

A long-standing defect in the behavior of Data Fields when set to "Editable = No" has been fixed. In the past non-Editable fields were created using the Windows Disabled style, which led to problems with fore- and back-ground color settings, and with navigation. In CTD 2.x, non-Editable fields are created with the Windows Read-only style, and so they have a different appearance (and will honor color settings), are navigable, and allow for the selection and copying of their content text. Calls to SalEnableWindow() will reset the read-only style, and allow editing of the field contents. Note that there is not a direct SAL call to reverse SalEnableWindow for a field created as non-Editable, although you can use SalSendMessage to send the EM_SETREADONLY Windows message, with wParam set to FALSE, to reset the field to its original state.

As a result of this change, non-editable data fields will now receive focus. This is a feature that has pretty much become a Windows standard, and is not a bug. The non-editable datafield will still be protected from any input. However, by allowing the focus to enter these fields, the data can be copied from the non-editable datafield and then pasted somewhere else. If the older, non-standard behavior is required, a functional class could be called for each top-level window's Sam_CreateComplete to loop through the child datafields and multiline text fields to disable them if they are found to be non-editable.

Known Problems, Limitations and Workarounds

Installation

- If an error occurs during the installation with the text "you don't have privilege to make some changes and need to login as administrator" this means that there was a previous version of Centura Web Application Manager installed. To rectify, uninstall the product. Using REGEDIT.EXE, browse to \\HKEY_LOCAL_MACHINE\SYSTEM\CurrentControlSet\. Delete the Key "CenWebAppMgr." Reboot and reinstall.

- The CTD runtime deployment installer (deploy21.exe), Report Builder and Web Deployment installers can all be run in silent mode. To do so, execute deploy21.exe /S /M=silent.ini

- The '/S' is for Silent Mode and '/M' will read the values file. The values in silent.ini can be modified to suit your installation.

- The selection “Centura 2.1 Books Online” in the “Team Developer 2.1” program group requires a web browser to be installed and a “Default Browser” to be set.

Miscellaneous

- Since the version number of this release has changed, the names of most CTD EXE and DLL files have changed in order to avoid potential version conflicts. For example, CDLLI20.DLL is now CDLLI21.DLL. If you happen to have linked directly to one of these DLLs in your application (rather than using an APL provided by Centura), you should change the reference in your application in order to avoid strange behavior and crashes.

- UDVs passed as parameters to top-level Windows cannot be modified by assignment, either to other UDVs of an appropriate type or to the result of calling 'new'. External UDVs known only to an external outline are not fully supported. There are two known issues: SalObjIsDerived() does not work with these type of external objects (objects created in a different outline without any definition in the outline using it), and parameter type checking does not work for functions needing external objects.

- Assignment of Window classes derived from a base Functional class is not supported. This will not generate a compiler error, but will produce indeterminate results.

- Type Information is not embedded within COM DLL servers built on Windows 95.

- MTS component activation within a SQLWindows client EXE is not supported. CTD Client EXEs can only use MTS-registered components that are configured to run within a dedicated server process (Activation: Server Package).

- The Customizer is being deprecated in favour of the Attribute Inspector for modifying object properties. There are some known problems with the appearance of the Customizer on Windows 2000, and we recommend use of the Attribute Inspector instead.

- Certain samples require the presence of particular ActiveX controls (in particular, the Calendar Control 8.0). The COM servers used by the sample applications are fairly common, but may not be installed on your machine. If attempts to run the samples produce ActiveX error dialogs, you may not have the required server installed, or you may have an incompatible version.

Web Applications

- When deploying Web applications, please remember to run the CTD runtime installer (deploy21.exe) when you install your application. The Web Deploy installer does not include CTD runtime files.

- Netscape Web Servers later than Enterprise version 3.6 cannot be detected by the CTD 2000 installer. Please choose 'Other' as the Web server, rather than 'Netscape', if you are running a server later than 3.6 and 'Netscape Web Server' is not marked by default in the "Web Server Document Directory" installation dialog.

- When first running the Tutorial application in Web mode, you may see an error ("Error in comIslandPRODUCT.Create() : COM Server Failed") due to registration ordering issues if Web App Manager is automatically started as a Service. Restarting the application using AppConsole will resolve this issue.

- In AppConsole, it is not necessary to set Minimum Processes higher than 1 for dedicated applications, since each user will create and destroy processes when they use the application. For reusable applications, Minimum Processes can be set higher, so that performance is increased because these applications do not destroy processes. An optimum number for small to mid-sized applications may be in the range of 10-20. Having large numbers of processes running can result in errors due to running out of resources.

- Starting and stopping AppManager from AppConsole in rapid succession may result in initialization errors that can crash AppManager.

- If a machine running AppManager is shutdown, and the AppManager is being remotely administered from AppConsole, AppConsole may hang until the machine is re-started.

- Microsoft Personal Web Server and IIS 4 have been observed to truncate long POST messages to browsers - this can affect the operation of state variables.

- The Object Compiler cannot be used to compile Web applications on Windows 2000.

- When starting Web App Manager with multiple active applications (i.e. MinProcs > 1) that connect to SQLBase using anonymous pipes (SQLAPIPE), if SQLBase is not already started you may see an error to the effect that a server initialization failed because SQLBase was already running. This is a benign error and can be ignored. It is the result of a minor race condition during the auto-start behaviour of SQLAPIPE.

- In the case of a crash of a web application, system resources can be left open. Use Task Manager to end any orphan processes before restarting Web App Manager.

COM Events

- Events defined in a type library may not show up in a .APL file generated from that type library. In this case, in a client application, they will also not be listed under "Message Actions" for a COM proxy class derived from the COM proxy class that contains the events. If this occurs, open ActiveX Explorer and click on the "Centura APL's" radio button. Select the .APL file of interest. If a message appears stating that the registration for the type library is damaged, unregister and re-register the type library from which the .APL was generated, and regenerate the corresponding apl.

- COM Events are implemented as “callback” IDispatch methods where the server calls the client. This IDispatch identifier is known through a UUID. In CTD Message Actions for a COM Proxy, the “friendly” name for the event is displayed to the developer but the UUID is stored as a hidden property. This hidden property is only created during the definition of an event and is never refreshed. Therefore, if changes occur that invalidate this hidden property (such as changing the GUIDs of the COM server or replacing the COM server with another that has the same name but different UUIDs) the message action needs to be removed and added again.

- Events with parameters of either IDispatch or Object are not invoked.

COM Servers

- CTD COM server methods with a parameter datatype of DateTime do not accept values that are prior to January 01, 0100. An OLE Automation message “Error code at invocation of <method name> 80020005” occurs.

- A CTD COM client application passing a Variant parameter containing a SafeArray to a CTD COM server may yield unspecified results.

- A CTD COM client application passing a Variant parameter containing a IDispatch (Object) to a CTD COM server may yield unspecified results.

- If the Word 9.0 APL is generated using ActiveX Explorer and then the Word 9.0 ActiveX object is added to a form window, a GPF will occur on exit from CTD. Two possible workarounds are as follows: 1. Generate the .APL, exit CTD, then re-enter it to edit the application that contains the MS Word object in a form window. The GPF will not happen if the .APL was previously generated.

2. The default .APL generated by adding the Word 9.0 ActiveX object does not cause this problem. Do not use ActiveX Explorer to generate the .APL if it is not necessary to do so.

- A COM server function that returns a Variant that has been set to a blob value gets an OLE Automation error if a SetBlob is not performed within the function and the COM server is "out of process" (EXE.) This can be worked around by: Making the COM server "in process" (.DLL), or calling the GetBlob and SetBlob methods if a parameter of type Variant was passed into the function.

- A GPF may occur when you exit CTD under the following circumstances: 1. You are editing a COM server application that references a missing APL. 2. You regenerate that APL using ActiveX Explorer while editing the app. 3. You make a change that references a class already existing in the app and contained in the APL that has just been regenerated. You build an executable and save the app. To work around this problem, open a new CTD application, regenerate the APL from within that empty new application, and close that application without saving it.

Connectivity Limitations

- You cannot connect to SQLBase from a web application using the anonymous pipes protocol (sqlapipe) unless SQLBase is running as a service. Another workaround is the use of the TCP/IP protocol instead.

- Microsoft SQL Server OLE DB Provider does not support converting a long database type (text, image) into a BSTR type. So, if a CTD application is trying to read a database text/image column into a String variable type, the fetch call fails. However, a similar operation succeeds through the ODBC router.

- Microsoft SQL Server OLE DB Provider has limitations in converting a BSTR type into a datetime database type. So, if a CTD application is trying to insert a String variable into a datetime column, the provider requires that the datetime format in the String be <yyyy-mm-dd hh:mm:ss>. If the datetime format is different, insert call fails. The problem is that the SQLBase string datetime format is different. SQLBase format is <yyyy-mm-dd-hh:mm:ss.msmsms>. Note here the difference is in the hyphen (-) character between the date part and the hour part. But, a similar operation succeeds through the ODBC router.

- Microsoft SQL Server OLE DB Provider does not support converting a datetime database type into a BSTR type. So, if a CTD application is trying to fetch a datetime column type into a CTD String variable, the fetch call fails. However a similar operation succeeds through the ODBC router.

- When using OLE DB, the error reporting behaviour at EndOfFetch is slightly wrong. At the end of a fetch, SqlFetchNext() correctly returns FALSE and sets FetchIndicator to EOF (1). However, a call to SqlGetStatementErrorInfo() will return an error number of 0 (and no error text). This behavior, which also applies to result sets returned from stored procedures, does not occur when using the native routers. In the case of native routers, a call to SqlGetStatementErrorInfo() will correctly return error number 1 (and the text "End of fetch").

- SqlPrepareSP does NOT support Output parameters when used with Microsoft SQLServer. Output parameters are supported with Oracle PLSQL - both with Microsoft Oracle Provider and Merant Oracle Provider. Array type parameters are NOT supported with any provider. Return status is supported with Microsoft SQLServer. There is no separate function to get the value of the return status.

- With Microsoft Oracle OLE DB Provider, If the user has only Oracle 7.x client software installed, they cannot use the OLE DB provider to execute PL/SQL Statements that have out parameters. The out parameters are not updated.

- Connecting to Oracle 8.x databases in an MTS environment is quite involved. Please refer to the following Microsoft Knowledgebase article for instructions on this subject: http://support.microsoft.com/support/kb/articles/Q193/8/93.asp. The Oracle 8.1.6 client works best with MTS. NOTE: Oracle 8.1.6 client was still in Beta at the time of this release.

- CTD 2.1 has increased the number precision from 18 digits to ~40 digits. This significant improvement can be used with a database only if you use the OLE DB connectivity. If you connect to SQLBase or via the Native routers to any of the databases (ODBC Router or Oracle Router and so on), you will get the old precision of up to 18 digits.

- The Native router for Ingres is not threadsafe. You should not use Ingres connectivity with 'Single Threaded Apartment' COM servers. Usage in Web applications may also give unpredictable results.

- SqlGetParameter (DBP_BRAND) for all OLE DB statements created, will return 41 (SQLBOLE). Whether the datasource was Microsoft SQLServer or Oracle, the call will always return SQLBOLE.

Certification Information

SQLRouter / Oracle

SQLRouter / Oracle provides native connectivity from Centura Team Developer to Oracle.

SQLRouter / Oracle Compatibility

This version of the SQLRouter / Oracle is certified with:

Operating Systems

- Microsoft Windows 2000
- Microsoft Windows NT 4.0
- Microsoft Windows 98
- Microsoft Windows 95

Gupta Software

- SQL/API 7.6.01

Oracle Software

- Oracle 8.1.7
- Oracle 8.1.6
- Oracle 8.1.5
- Oracle 8.0.5
- Oracle 8.0.4
- Oracle 7.3.4
- Net 8

Network Software

- TCP/IP

SQLRouter / Microsoft SQL Server

SQLRouter / Microsoft SQL Server supports Microsoft SQL Server, using its native call-level interface-ODBC. The following section contains information about SQLRouter / Microsoft SQL Server.

SQLRouter / Microsoft SQLServer Compatibility

This version of the SQLRouter / Microsoft SQLServer is certified with:

Operating Systems

- Microsoft Windows 2000
- Microsoft Windows NT 4.0
- Microsoft Windows Me
- Microsoft Windows 98

- Microsoft Windows 95

Gupta Software

- SQL/API 7.6.01

Microsoft software

- Microsoft ODBC 3.520.7326.0 Driver Manager
- Microsoft ODBC 3.5 Driver Manager

Microsoft SQL Server software

- Microsoft SQL Server 8.0
- Microsoft SQL Server 7.0

Microsoft SQL Server client software

- Microsoft SQL Server ODBC driver version 3.80.0380.00, ODBC version 3.51
- Microsoft SQL Server ODBC driver version 3.70.06.23, ODBC version 3.51

SQLRouter / ODBC

SQLRouter / ODBC supports generic ODBC interfaces.

SQLRouter / ODBC Compatibility

This version of the SQLRouter / ODBC is certified with:

Operating systems

- Microsoft Windows 2000
- Microsoft Windows NT 4.0
- Microsoft Windows Me
- Microsoft Windows 98
- Microsoft Windows 95

Gupta Software

- SQL/API 7.6.01

Microsoft software

- Microsoft ODBC 3.520.7326.0 Driver Manager
- Microsoft ODBC 3.5 Driver Manager

ODBC drivers certified

- Microsoft SQL Server 8.0 driver from Microsoft v8.00.382
- Microsoft SQL Server 7.0 driver from Microsoft v7.00.623
- IBM DB2 ODBC Driver Version 7.01.00.40

Network Software

- TCP/IP

SQLRouter / Sybase

SQLRouter / Sybase provides native connectivity from Centura Team Developer to Sybase Adaptive Server using Sybase CT-Lib.

SQLRouter / Sybase compatibility

This version of SQLRouter / Sybase is certified with:

Operating Systems

- Microsoft Windows 2000
- Microsoft Windows NT 4.0
- Microsoft Windows Me
- Microsoft Windows 98
- Microsoft Windows 95

Gupta Software

- SQL/API 7.6.01

Sybase System

- Sybase Adaptive Server Version 12.5
- Sybase Adaptive Server Version 12.0
- Sybase Adaptive Server Version 11.9.2
- Sybase Adaptive Server Version 11.5

Network Software

- TCP/IP

SQLRouter / Informix

SQLRouter / Informix provides native connectivity from Centura Team Developer to Informix OL and Informix SE.

SQLRouter / Informix Compatibility

This version of SQLRouter / Informix is certified with:

Operating Systems

- Microsoft Windows 2000
- Microsoft Windows NT 4.0

Gupta Software

- SQL/API 7.6.01

Informix software

- Informix-OL 7.3 on Windows
- Informix-SE 7.3 on Solaris 2.4

Informix Client software

- Informix-Net TCP/IP 7.3 TD 1 for Windows NT and Windows 2000

Network Software

- TCP/IP

SQLRouter / Ingres

The following section contains information about SQLRouter / Ingres. This release of SQLRouter / Ingres supports CA-OpenIngres v1.2 for Windows NT. Please read Connecting Centura Objects to Databases for information regarding connectivity to Ingres. Note that the native Ingres router is not thread-safe (see Known Problems and Limitations).

SQLRouter / Ingres Compatibility

This version of SQLRouter / Ingres is certified with:

Operating Systems

- Microsoft Windows 2000
- Microsoft Windows NT 4.0
- Microsoft Windows 98
- Microsoft Windows 95

Gupta Software

- SQL/API 7.6.01

Ingres Software

- CA-OpenIngres for Windows NT version 2.0 (w/1.2 Client)
- CA-OpenIngres NET (int.wnt/03)
- Patch 4015

Network Software

- TCP/IP

OLE DB Data Providers

OLE DB provides connectivity from Centura Team Developer to different databases through OLE DB Data Provider.

This version of the OLE DB provider is certified with:

Operating Systems

- Microsoft Windows 2000
- Microsoft Windows NT 4.0
- Microsoft Windows Me
- Microsoft Windows 98
- Microsoft Windows 95

OLE DB drivers certified

- Centura SQLBase OLE DB Provider v1.0.00 PTF3

- Microsoft OLE DB Provider for SQL Server Version 08.00.0380
- Oracle Provider for OLE DB 8.1.7.0.0

Network Software

- TCP/IP