Reality v15.2

Release Information

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Document control

Software Version	Document Status	Document Revision	Issue Date	Reason for Change
v15.2	Published	v0.1	30/04/2020	Final draft

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Section 1: Introduction

The Reality V15.2 release is delivered as a Service Pack, and as such all references to delivery DVD/ISOs require you to use the V15.1 delivery for new installs, followed by in the installation of Service Pack #200 — refer to the Reality website under Latest Product Updates. For existing V15.1 systems, you only need to load the Service Pack.

Reality is a software environment that supports multiple MultiValue SQL-enabled databases on a single host and includes a range of powerful utilities for building, managing and accessing the databases.

The release information in this document applies to Reality V15.2 for UNIX and Windows. Reality V15.2 adds new features and enhanced compatibility with similar database systems. Faults reported since the production release of Reality V15.1 have been resolved. See New features in Reality V15.2 (page 11) and Fault Resolutions (page 21) for more details.

Reality V15.2 is delivered as a Service Pack#200 to be loaded onto V15.1 systems.

Please check the Reality website for details of a replacement V15.1 ISO/DVD image file.

1.1 Retirement notice

This version of the software supersedes all previously released versions. NEC Software Solutions policy is to withdraw support for previous versions six months after a new release. The relevant date for this software can be obtained from your NEC Software Solutions representative or the Reality website.

1.2 Backwards compatibility

NEC Software Solutions attempts to make each new version of Reality fully backwards compatible with previous versions. However, fault resolutions and new features can, in some cases, result in changes to menus and prompts displayed by host and TCL utilities. Scripts which automate such utilities may therefore need to be reworked after upgrading or installing updates.

1.3 Deliverables

Reality V15.2 is delivered as a Service Pack#200 to be loaded onto V15.1 systems. Please check the Reality website for details of a replacement ISO/DVD image file that contains:

Reality ISO/DVD image file

- Reality
- User Documentation
- UNIX-Connect
- Reality Remote Tape
- PDS History Tool
- PCSNI (client)

- JReal (client)
- RealSQL-JDBC Driver (client)
- RealSQL-ODBC Driver (Windows client)
- RealSQL-ODBC Driver (UNIX client)
- RealWeb HTML
- RealWeb Servlets
- Reality Demonstration
- RealWeb Demonstration
- WinSNI Configuration Editor (client)
- RealEdit (client)
- Remote Basic ActiveX Control
- TCP Bridge

Web Services ISO/DVD image file

- Reality Web Services - Incoming (Outgoing web services are supplied in the Reality delivery)

1.4 Reality website

Visit the Reality website for:

- Product information.
- Latest updates.
- Latest documentation.

  Reality is supplied with comprehensive Online Documentation for viewing in a web browser. Refer to the Document Directory in the online documentation for details.

  Note
  The documentation is subject to change and it is essential that you have the latest version. You should regularly access this from the Reality website.

  For any suggestions or improvements to this documentation, please contact your NEC Helpdesk.
- Enquiries.

Section 2: Prerequisites

2.1 Reality on UNIX

- UNIX 64-bit architecture:
  - SUN SPARC running Solaris 11 or Solaris 10
  - IBM pSeries running AIX 7 or AIX 6
- Linux 64-bit architecture on Intel x64:
  - Red Hat ES 7 or 6 commercial release
  - CentOS 7 or 6 open software
- 128 MB RAM minimum (512 Mb recommended), plus 2-6 MB per Reality User. See also Memory (page 8).
- 1 GB of available space to accommodate set up (actual hard disk used once installed will be between 220 MB and about 350 MB, depending on the system components installed, plus space for databases).
- Korn shell.
- Perl - this is normally supplied with the operating system.
- UNIX-Connect for networking (supplied in the Reality ISO/DVD image file).
- NEC Software Solutions Customisation (a download is available for SUN; for other operating systems, contact NEC Software Solutions).
- C compiler (on Solaris, if a C compiler is not available you can install the GNU C Compiler from the NEC Software Solutions Customisation download).

2.2 UNIX-Connect

'rosi' UNIX user id with a home directory on a file system with at least 25 Mbytes free.

2.3 Reality on Windows

- PC with Intel x86/x64 processor or equivalent, 1 GHz or faster:
  - Windows 10 (64-bit only)
  - Windows 7
  - Windows Server 2012
  - Windows Server 2008
- The minimum memory as required for the base Windows release, plus 2-6 Mb per Reality user. (See also Memory (page 8).)
- Up to 1.5 GB of available disk space to accommodate setup (actual hard disk used once installed will be between 150 MB and about 350 MB for 32-bit and up to 500 MB for 64-bit deliveries, depending on the system components installed, plus space for databases).

  It is recommended that Reality is installed on an NTFS partition.
- The Reality database can be loaded on to a Primary Domain Controller, Backup Domain Controller, stand-alone member server or WorkStation.
- Reality backup and restore is supported on 4 mm, 8 mm and DLT/LTO tape units.

- Using at least a dual processor system is highly recommended for more than a small user count in order to run on recent Windows releases.
- NEC Software Solutions can take no responsibility for the processor and memory requirements of other applications running on a Windows server. Ideally, Reality should be loaded on a dedicated server.
- NEC Software Solutions recommend Microsoft's A Guide to Assessing Windows Server Licensing and their prevailing licensing policy is used to determine what is required for end user deployment.

2.4 Memory

Reality memory usage is difficult to predict, but as a rough sizing guide use 128 Mb for the system and then 2 to 6 Mb per user, depending on type of user and application.

Performance problems are generally caused by lack of memory. If the server is not dedicated to Reality then other application memory requirements must be added to this.

2.5 Foreign database support and SQL View

These features require a working ODBC installation, with appropriate ODBC driver(s), on the Reality system.

External components

PCSNI

- PC with Intel x86/x64 processor or equivalent, 1 GHz or faster, with 1 GB (for 32-bit) or 2 GB (for 64-bit) of memory, running Windows 10, Windows 7, Windows Server 2012, Windows Server 2008 (32-bit or 64-bit).
- A LAN card.
- TCP/IP networking.
- A way of resolving host name and IP addresses (for example, a hosts file or a domain name service).

2.6 RealEdit

- PC with Intel x86/x64 processor or equivalent, 1 GHz or faster, with 1 GB (for 32-bit) or 2 GB (for 64-bit) of memory, running Windows 10, Windows 7, Windows Server 2012,
- Windows Server 2008 (32-bit or 64-bit).
- NEC Software Solutions PCSNI software V2.3.1 Rev C or later.

2.7 JReal

Java Run Time Environment (JRE) version 1.4.1_02 or above. If this is not available, it can be downloaded from:
http://www.oracle.com/technetwork/java/javase/downloads/index.html

2.8 RealSQL-ODBC Driver

- PC with Intel x86/x64 processor or equivalent, 1 GHz or faster, with 1 GB (for 32-bit) or 2 GB (for 64-bit) of memory, running Windows 10, Windows 7, Windows Server 2012, Windows Server 2008 (32-bit or 64-bit).

- NEC Software Solutions PCSNI software V2.3.1 Rev C or later.
- Any ODBC Level 1 or 2 compliant application.
- A Winsock compliant TCP/IP transport stack for TCP/IP connections.
- If you are connecting to a Reality database on a UNIX host, the host will need UNIXConnect.

The PC applications and transport stacks use large amounts of memory. It is therefore essential that PCs running this package are configured for the optimum use of memory; otherwise it is possible that GPFs and other memory type errors will occur.

2.9 RealSQL-JDBC Driver

- Java Run Time Environment (JRE) version 1.4.1_02 or above. If this is not available, it can be downloaded from http://www.oracle.com/technetwork/java/javase/downloads/index.html.
- If you are connecting to a Reality database on a UNIX host, the host will need UNIXConnect.

2.9 RealWeb

- A web server with support for Java servlets. (This can be on the same system as the Reality database or on another system.) On web servers that do not support servlets, plug-ins can be used to add servlet support.
- Java Run Time Environment (JRE) version 1.4.1_02 or above. If this is not available, it can be downloaded from http://www.oracle.com/technetwork/java/javase/downloads/index.html.
- If you are connecting to a Reality database on a UNIX host, the host will need UNIXConnect.

2.10 Remote Tape Server

- Any UNIX or Windows system that supports Reality.

Note
The Reality Database product does not have to be loaded onto the Server with the tape devices, only the Remote Tape Server component.

2.11 Reality Web Services

- A web server with support for Java servlets (Jetty is supplied). This can be on the same system as the Reality database or on another system. On web servers that do not support servlets, plug-ins can be used to add servlet support.

  Note
  Reality Web Services have been tested on Jetty 5.1.4 and Tomcat 5.

- Java Runtime Environment (JRE) or Java Development Kit (JDK), version 1.4.1_02 or later. For Jetty, you can use either; for Tomcat you must use a JDK.

2.12 Remote Basic ActiveX Control

- PC with Intel x86/x64 processor or equivalent, 1 GHz or faster, with 1 GB (for 32-bit) or 2 GB (for 64-bit) of memory, running Windows 10, Windows 7, Windows Server 2012, Windows Server 2008 (32-bit or 64-bit).
- PCSNI (client) software V2.3.1 Rev C or later.

2.13 Online Documentation

The online documentation is intended to be installed on a web server. If necessary, it can also be installed on file server, or on individual PCs running Windows or Linux. It can also be viewed from the Reality ISO/DVD image file.

The online documentation is compatible with most contemporary web browsers (those listed below are suitable). However, be aware that browsers can change over time as to what they allow access to, in terms of local/remote drives and/or websites, so browser settings may need to be checked. If a particular browser prevents access, please try another browser:

- Mozilla Firefox
- Safari
- Google Chrome

Section 3: New features in Reality V15.2

Reality V15.2 contains a number of new features since the release of V15.1, including the introduction of hyper files and significant DataBasic enhancements.

Some of the new features have come from the user feedback that we receive during the life of a release, so please continue to use the 'Comment on this topic' links at the top and bottom of each topic in the Online Documentation, or visit the Reality website, in order to help us to improve your Reality.

3.1 Hyper files

A hyper file is a logical view on to a number of discrete data sections in multiple physical files, including remote files. Accessing a hyper file accesses these data sections — referred to as hyper sections— as if they constituted one file.

Hyper files are primarily intended as a way to split a very large file into more manageable units. Significantly, item IDs must be unique across all hyper sections and include information —known as the hyper key— that is used to determine in which underlying physical data file each item belongs.

Applications can choose to access and update all of the hyper sections that comprise the hyper file as one logical view, or as each separate underlying physical data section file. Each data section can use dictionary definitions and indexes as normal, with the hyper file able to use all of these for its view across all data sections, provided that they are logically consistent.

For example, sales figures could be updated, processed and analysed as one hyper file opened as SALES, which is actually a view of the separate data section files called SALES_CURRENT, SALES_2014, SALES_2013, and so on. Existing applications could see all these separate data sections as one logical file called SALES.

The SALES hyper file can use English, DataBasic and the rest of the Reality features just like any standard file, including updates using dictionaries and indexes. The same file access is also available to the constituent hyper sections.

The history years of hyper sections could be fully accessible to updates, or restricted within the application to controlled maintenance so that sizing is stable. Hyper sections can be stored locally in the same or different databases, including remotely. They can be updated under application control or reside in non-updating databases. In our example, the SALES_CURRENT hyper section could be the only part of the hyper file within the main live database, growing throughout the year, and optimising performance because all previous years' hyper sections are within another database. When needed, however, all sales figures would be accessible through the SALES hyper file.

This release provides new commands that operate exclusively on hyper files, and updates some existing commands so that they can work with hyper files.

The following commands apply exclusively to hyper files:

- HYPER-CREATE

  Creates a hyper file by creating a hyper file definition item (H-pointer) and optionally the hyper sections.

- HYPER-EDIT

  Edits a hyper file by updating the hyper file definition item (H-pointer).

- HYPER-ADD

Adds a new section to an existing hyper file by updating the lookup table in the hyper file definition item (H-pointer).

- HYPER-CREATE-INDEX

  Creates an index on all hyper sections and then adds it to an existing hyper file.

- HYPER-ADD-INDEX

  Adds a specified index to an existing hyper file.

- HYPER-LIST

  Displays the contents of a hyper file definition item (H-pointer) in a formatted manner.

- HYPER-RECONCILE

  Reconciles a specific section, or all sections, of a hyper file by moving items to their correct sections.

- HYPER-REMOVE

  Removes a specific section, or all sections, from a hyper file by updating the lookup table in the hyper file definition item (H-pointer) and removing any applicable update locks from the sections; optionally, it deletes the data sections themselves.

- HYPER-REMOVE-INDEX

  Removes a specific index from a hyper file definition item (H-pointer).

- HYPER-VALIDATE

  Validates a hyper file by ensuring that all its constituent hyper sections:

  - Have the same transaction logging status.
  - Have the same save/restore status.
  - Have index definitions that match those in the hyper file definition item (Hpointer).
  - Can be opened.

- HYPER-VERIFY-INDEX

  Verifies a specified index on all hyper sections in a hyper file.

3.2 DataBasic debugger enhancements

This release includes enhancements to the DataBasic debugger, including the following new and modified debugger commands:

Option	Description
?	Displays help pages.
?M	Displays the name of the program module currently running.
B	Adds an entry to the break point table.
CP	Toggles switch to enable or disable cursor positioning.
D	Displays the current state of DataBasic debugger controls and options, as set by various debugger commands.

Option	Description
MA	Causes the debugger to be entered on all active statement lines in a named code module, by adding the module to the list of monitored modules.
MD	Removes monitoring for a named code module, or all code modules, by deleting them from the list of monitored modules.
ME	Causes the debugger to be entered on entry to the start of a named code module, by adding the module to the list of monitored modules.
MO	Causes the debugger to be entered on reaching the line that immediately follows the current call to another module; in other words, it steps over the call. MOO turns off MO stepping over (and MX stepping out) operations.
MR	Causes the debugger to be entered on (re-)entry to a named code module from any other module (that is, after a **CALL** or **RETURN** command) by adding the module to the list of monitored modules
MX	Causes the debugger to be entered immediately on returning from the current module to the calling module; in other words, it steps out of the current module. MXO turns off MX stepping out (and MO stepping over) operations.

A code module can be any single DataBasic code item; that is, a program, an external subroutine or an external function.

The monitored list can contain any number of modules, but the longer the list the greater the potential performance impact.

The monitored list is unique to a single context and is reset on return to TCL.

Note

These enhancements were first announced in the Reality 15.1 Online Documentation (Revision 7) Documentation Note. However, in this current release the MA, ME, MR and MD commands are no longer a separately licensed feature of the Reality.

3.3 DataBasic Email application programming interface

A new DataBasic Email application programming interface (API) provides a mechanism that allows emails with attachments to be sent from within DataBasic.

- EM_DEFINE_CONFIG

  Optionally specifies an email configuration file that contains any predefined configuration items. This can be unique to the current account, or a Q-pointer to allow for a global configuration.

  The default email configuration file (which is assumed if no alternative file is specified by this function) is EM_CONFIG in the account from which the DataBasic Email API is being called.

- EM_START_EMAIL

  Defines the start of an email by defining the connection information for the mail server to be used. If a predefined host configuration item is specified the details are loaded from that item; these details can be overridden by providing additional configuration parameters.

- EM_ADD_DELIVERY_DETAILS

  Adds the delivery details to the started email, including the email addresses of the sender and at least one recipient. If a predefined delivery configuration item is specified the details are loaded from that item; these details can be overridden by providing additional configuration parameters.

- EM_ADD_ATTACHMENT

  Adds an attachment to the email from the supplied content. The size of the attachment is limited by the size of the memory available to the user.

- EM_ADD_ATTACHMENT_ITEM

  Adds an attachment to the email from the supplied file and item. The size of the attachment is limited by the size of the memory available to the user.

- EM_ADD_HTML_TEXT

  Adds an HTML-formatted fragment to appear in the body of the email. This is displayed only if the client receiving the email can display HTML.

- EM_ADD_PLAIN_TEXT

  Adds a plain text version of the email to the body of the email. This is displayed if the client receiving the email cannot display HTML or if an HTML version is not supplied by EM_ADD_HTML_TEXT.

- EM_SEND_EMAIL

  Sends the email that has been constructed using the defined connection information.

- EM_ENABLE_DEBUG

  Enables the printing of debugging information including the encoded content when the email is sent.

3.4 DataBasic application dump

This new feature allows a DataBasic application to dump (save) some information about its state, either automatically or on request.

There are three main situations when a DataBasic application dump may be required:

- On generation of a DataBasic run-time warning or fatal error message (WARN or ABORT dump items).
- On detection of a DataBasic application internal programming logic error (SOFT dump
- items).
- When requested by the user in the DataBasic debugger (DEBUG dump items).

3.5 BASIC-DUMPS file

A default global BASIC-DUMPS file is supplied, in the SYSFILES account, in which to store DataBasic application dump items.

3.6 Warning and fatal run-time errors

Whenever DataBasic generates a warning or fatal message, even if these messages are suppressed, the system creates a respective WARN or ABORT dump item and saves it to the BASIC-DUMPS file.

3.7 BASIC.DUMP statement

A BASIC.DUMP DataBasic statement allows the programmer to write a SOFT dump item to the BASIC-DUMPS file whenever required.

3.8 DUMP.BASIC.VARS custom option

A DUMP.BASIC.VARS custom option is provided which, if set in an environment definition, causes the WARN, ABORT and SOFT dump items to include the program variables and their contents. If the option is clear (unset) these items do not include the program variables. DUMP.BASIC.VARS is clear by default.

3.9 DUMP command

A DUMP DataBasic debugger command generates a DEBUG dump item that contains all of the program's variables (regardless of the setting of the DUMP.BASIC.VARS option) plus an optional user-specified message.

3.10 DISP.DB.DUMPS program

A DISP.DB.DUMPS cataloged DataBasic program is provided to display DataBasic application dump items from either the default BASIC-DUMPS file or a user-specified alternative.

3.11 Default DataBasic compiler specified in environment definition

The SSM (Security System Maintenance) command has an improved SSM Option 4 – Define Environment Settings option, which is shared by the DEFINE-ENVIRONMENT TCL command. In addition to being significantly easier to use, it now includes the ability to define the default DataBasic compiler for an operating environment.

An environment-specific compiler is also useful to maintain live "current code" that is running on end-user systems while any testing is performed to make sure that any MultiValue compatibility changes, or new or updated features, are fully understood.

If an environment setting is not specified, the BASIC*DEFAULT synonym entry in the BASICCOMPILERS system file in the SYSFILES account is used instead.

The DataBasic SYSTEM(120) function returns the name of the current environment and SYSTEM (121) returns the name of the current default compiler.

3.12 Password definitions

The SSM (Security System Maintenance) command has a new SSM Option 6 - Define Password Definitions option to create and update password definitions for users and accounts.

Password definitions allow you to define the valid composition of passwords including minimum and maximum length; allowed patterns of alphabetic, numeric and special characters; sequences of ascending or descending characters; and so on.

Password definitions are stored as items in a new PW.DEFINITIONS system file in the SYSMAN account. User and account password definitions are distinguished in the file, so that it is possible to have user and account password definitions with the same name (for example, the DEFAULT password definitions).

3.13 User password definitions

Each user profile either explicitly references a user password definition or implicitly references the DEFAULT user password definition. Multiple users can share the same password definition.

User password definitions complement existing features of user profiles that control, for example, how long a password remains valid, how many retries are permitted, and so on. In addition there are two new features to force the user to change their password when they next logon, and to specify what happens when the password expires.

User passwords specified by using either the PASSWORD command or SSM Option 2 – Define User Profiles must meet the rules of the relevant user password definition, although these can be overridden from the SYSMAN account.

The DataBasic SYSTEM(119) function returns the name of the current user password definition item.

3.14 Account password definitions

Each account either uses the account password definition with the same name or, if none exists, the DEFAULT account password definition. However, an account password definition item can be a synonym to an actual account password definition, so multiple accounts can effectively share the same password definition.

Account passwords specified by using either the PASSWORD (A or CREATE-ACCOUNT command should meet the rules of the relevant account password definition, although these can be overridden from the SYSMAN account.

Note

These changes mean that the PasswordLength database configuration parameter is now redundant. On upgrading to this release the current value of PasswordLength (if any) is used to set the Min password length attribute of the DEFAULT user password definition. Similarly, the DEFAULT account password definition is also configured for backwards compatibility.

3.15 Preview of the User Interface Framework

The User Interface Framework (UIF) is an extensible feature eventually intended to provide a mechanism to separate the business logic of an application from its presentation or display logic.

For example, it is used internally by the MOUNT-IMAGE command.

Depending on user feedback, this feature will be further enhanced in future releases.

3.16 Multiple clean log deletions from tlmenu

Multiple clean log deletions are now possible from tlmenu, allowing simplified maintenance of the data-resilient features Transaction Logging, Shadow, FailSafe and Disaster Recovery.

On using the tlmenu database command:

Administration Options

==========

1. Routine Maintenance
2. Configuration and Setup
3. Database Recovery
4. Miscellaneous
5. Disaster Recovery Configuration and Maintenance

S. Show Logging Status (from any menu)
Enter option (1-5,S) :
On selecting option 1, Routine Maintenance:
Routine Maintenance
==========

1. Switch Clean Log
2. List Clean Logs
3. Archive Clean Log
4. Delete Clean Logs
5. Start Transaction Logging Status Monitor
6. Stop Transaction Logging Status Monitor
7. Save multiple Clean Logs to tape
8. Load multiple Clean Logs from tape
9. List multiple Clean Logs on tape
10. Save the Database

Enter option (1-10) :
On selecting option 4, Delete Clean Logs, the user is prompted:
This option deletes multiple clean logs from disk
Do you want to do this (y/n/q) ? :

On entering y, you are shown a number list of clean logs available for deletion, from which you can select individual logs or ranges of logs in any combination. Alternatively, you can enter the name of a particular clean log you want to delete.
Select Clean Logs to Delete
==========

1. CLOG160119-001
2. CLOG160119-002
3. CLOG160119-003
4. CLOG160119-004

5. CLOG160119-990
6. CLOG160119-991
7. CLOG160119-992
8. CLOG160119-993
9. CLOG160119-994
10. CLOG160119-995
11. CLOG160119-996
12. CLOG160119-997

Enter selections (eg 1,2,4-6) or Clean Log file :

3.17 Miscellaneous other changes

- To increase efficiency, and for compatibility with mvEnterprise, the DataBasic MATCH {ES} relational operator now supports a greater variety of patterns, and a new MATCHFIELD function is also provided which is similar to MATCHE{ES} but also returns the characters that match a requested sub-field of a pattern. To preserve backwards compatibility, the extended features of MATCHE{ES} are enabled by a new EXT.MATCH compatibility option.
- The / (forward slash) DataBasic debugger command is updated to make it easier to display and edit arrays.
- A new BASIC System debugger command is provided to switch to the DataBasic debugger.
- A new MOVE TCL command is provided to move items from one file/data section to another file/data section, while preserving their time-stamps.
- The DB (DataBasic) TCL command now includes additional @ commands:

?	Displays a command summary.
F file-specifier	Changes the current file.
I item	Changes the current item.
M	Enters the ME editor to edit the program.

- All commands are now case-insensitive.

Clean logs are now accessible from DataBasic.

Clean logs can be accessed from DataBasic by opening and reading them as for any standard Reality file. This enables a secure and high level access to Transaction Logging clean logs to provide detailed auditing of all database updates. With access to data becoming ever more complex this feature allows full and accurate audit information on how any database item has been changed, and helps with tracing potential security breaches where unauthorised updates have been made.

Section 4: Restrictions

This section lists the restrictions that were current when Reality V15.2 was released. For the latest information, refer to the Reality website.

For this release

- As Reality V15.2 is delivered as a Service Pack you must load V15.1 and then the latest Service Pack; that is, SP#200 or above.
- The new hyper files feature requires application changes for typical use therefore you must run application acceptance tests before going live with this feature. Acceptance testing is recommended for all features that require application changes.
- File triggers can currently only be associated with file data sections.
- Shadow database cannot currently use partition databases constructed from standard host files on different file systems (see Types of Database).

Online documentation

If the documentation is installed on the local file system and you are using Internet Explorer, you may receive a number of security warnings regarding active content. These can be avoided by installing the documentation on a web server (recommended), or by selecting the Allow active content to run in files on My Computer option (you can find this in Tools | Internet Options..., on the Advanced tab under Security).

Section 5: Fault Resolutions

Reality V15.2 includes resolutions of the following faults.

Declared for the initial Reality V15.2 release.

Fault number	Description
85840	FLZ abort when array mismatch between calling and called programs with DataBasic Dump CDE on system.
85842	Basic subroutine error on line 1 with "Bad Stack Descriptor" message.
85849	Autoswitch binary reporting failed message after loading patches to 154.
91277	Quit out of SYS-UPDATE early and tape 1 and T-DEVICE are still assigned to dbfile.
91321	CREATE-TRIGGER on an indirect file checks local MD not indirect for trigger code.
91336	Apparent limit on data from Reality SQL to SQL Server.
91340	DataBasic compiler reports wrong line number when syntax error in a LOOP.
91353	TL - AUTOSWITCH resets to suffix 00 if 99 already exists as next suffix rather then look at 100 onwards.
91354	Unable to set up Shadow configuration on Windows.
91363	Rebuilding and restoring shadow database on Windows fails to connect to database to build skeleton files.

Declared in previous Reality V15.1 product updates.

Fault number	Description
91077	Make SYS-UPDATE from V14.0 more resilient.
91084 91094	Correct restore of non-Dptr items into SYSTEM.
91059	Prevents error messages being displayed during verbs such as FIND when querying SQL-VIEW files for item-ids that do not obey SQL rules.

85687	Solaris: Mount shadow fails fsck on zfs file system
91075	Resize existing AFS files during ACCOUNT-RESTORE
91087	Windows: Cannot create a database using realfstab
90994	Prevents RIF abort when SQL compiles "SELECT *". Now reports "Column '*''not found".
…..	Add ability to import .reg file
85684	Windows: realdump can hang trying to freeze the database.
91090	Enable mini web server to support % escape in URL and pdf documents.
85695	Skip logoff messages when aborted by RDB
85697	Correct problems with updates of partial indexes.
85699	Fix sporadic issue where SP-JOBS fails to open jobs file
85698	GET-LIST could display incorrect list length.
85688	Allow PERFORM or EXECUTE to optionally input from dynamic array data.
85700	Fix verification of multi clog save to remote tape
91086 85665 91072	Enable HTTPS to access non validated server realprof fails to return any data realevent fails to send notification emails
91097	Correct OPTIMUM-FRAME-SIZE and OPTIMUM-MODULO TCL verbs.
91106	Fix netadmin list all hosts with large number of hosts.
91088 91105	Enhance SYS-UPDATE error recovery.
85698 91096	Correct 64bit optimisation of scan and move virtual instructions.
85713	Inhibit DataBasic history logging on a single level source file.

85711	Do not try to release any locks on a DataBasic Index or select variable.
…..	Improve info reported if parallel tlrestore fails.
91109	Allow DataBasic Object to operate with binary strings.
85724	Stop realcd core dump when using session licences
85718	Allow 8GB raw log to be used.
85718	Fix various problems when malloc arena exceeds 4GB
85299 91131	Enable ISTAT of large files
91135	The DataBasic debugger is unable to stop or see the statement following an ECATCH statement.
…..	NFM CDE full clean log access
85727	Allow DR to continue after failover of failsafe master
91138	Fix problem with DataBasic substring with -ve starts of binary strings.
90609	DELETE, EDELETE, PROC F-W and F-D now report if a file is update protected.
85731	Fix core dump when nesting index selects.Â Fix size of index key when reading index
91148	Enable fix 31 to be installed correctly
85732 85734	Fix indexes with a translate conversion and fix CREATE-INDEX (N of huge files.
85729 85730	Stop TL-REJECTs when deleting clean logs. Enable tlmenu to deconfigure Failsafe
…..	Completely remove Reality from Windows system
85727	Add database instance with -i or -a
85735	Reinstate CHARGE-TO display to WHO and U50BB.
91151	A DataBasic ACCESS abort could corrupt the DataBasic runtime stack.

91150	Fix creating multiple partition database in Windows
…..	PCL TO PDF CDE
…..	PF99.27 - Add initial support for despooler filters.
85736	Fix SQL view for 64 bit reality to SQLserver 2008
…..	Correct issues seen ODBC/SQL in VB prog on 64 bit
85714	Correct item body length of partial read of unchanged item.
85738	Diagnostic to help resolve SQL view problem
91158	SQL DROP INDEX causes core dump
85740	Add DataBasic session and object variables to VARVAL and VARVALTYPE functions.
85743	Enable new despooler filter feature.
85733	Improve error messages if spinlock fails
85745 85736	Correct issues seen ODBC/SQL in VB prog on 64 bit

Fault number	Description
85714 85747	Correct item body length of partial read of unchanged item.
91169	DBO - Fix mishandling of numbers ending in D. Fix memory leak.
85471 85472 85780	Move DR delayed delete file to database and fix various hangups
85749	Ensure A*L*L FCB starts on a SR aligned boundary.
91172	Enable XML.GENERATE to handle mutivalue data including subvalues

85753	Correct restore of V14.0 DataBasic object items.
91175	Correct print-catalog with no file but 2 or more items.
85754	Fix bug where OG items in an AFS file can be corrupted after upgrading to 15.1
91178	Enable ISTAT ... (U to work on an active file
85755	Suppress benign daemon log errors for remote files
…..	PCL2PDF - Add font map, properties and back sheet configuration
85757	Fixes PERFORM TERM after PRINTER ON
85754	Preserve update time when AFS moves an item
85765	The realroot script now works ok in Bourne shell
85719	Enable RealEdit to select account/item name
85766	Correct DataBasic debugger Trace on 64 bit Solaris.
85771	Correct AND-LISTS and AND-ITEMS when used with a null list/item.
85772	Stop closing remote index from disconnection session.
85778	This fixes loss of keyboard data from Accuterm.
85779	Aborting window @ logon no longer causes 100% cpu
91031 91207	Enhance BVERIFY to fully compare objects while handling date and times separately.
85777	Provide support for NpuRetries & NpuDelay configs
91208	Stop LICENCE SFAM responding to junk item ID's
91217	Correct ALL SORT xmode problem.

85787	Fix SELECT/COUNT of DIR-VIEW on latest RedHat/Centos

Fault number	Description
85777	Diagnostic tracing for npu delays
91214	Unix: Allow debug build to include/exclude fixes
91219	Fix perl script warnings on Centos 7
85789	Ensure that the ALL window CB is on 8-byte boundary.
91222	Enable DIR-VIEW to list large items
91187	Enable build of reality on Centos 7
84797	Enable read of pre V14.0 compressed tape
85792	Correct BVERIFY of V14.0 or earlier object code.
…..	Fix corrupt dbfile on 32 bit Windows
85702	Add SQLPRIV to SQL.DEMO
85756 85776 91197 91227 91226 91225	Various updates to tlmenu
91177	Allow database to be created with non AFS system files.
91200 91201 91205 91183	DataBasic Dump CDE and various DataBasic debugger fixes.
91183	

91215	Windows: Enable DBUPDATE to run correctly when telneted into database.
85795	Fix TL-STATUS (B corruption of secondary status
85792	Correct BVERIFY of V14.0 or earlier object code.
91232	Fix RealWeb insert item after DataBasic objects changes
85748	Fix issue of SERVICE-LOG items not wrapping at 999
91234	Stop binary DIR-VIEW on Unix clearing binary flag.
85804	Correct DataBasic CONVERT function if oldCharList is NULL. 85794
85794	Allow DataBasic DUMP to work with external DataBasic.
91249	Enhance RESTORE to skip truncated DataBasic object items.
91242	Enhance DataBasic compiler to test string quotes in EQUATES at define time.
85808	Fix realdbck "ReloadPage Invalid argument" error
85809	Correct passing of a common array as a subroutine parameter.
91256	Maintain registers over an "Non-numeric" warning error message.
85698 91096 85798	Correct 64bit optimisation of scan and move virtual instructions.
91200 91210 91235	DataBasic Debugger CDE
91218	Correct ALL interface when reading an item that is not there.
91267 91236 91283	Various fixes and enhancement to install_fix

85810	Windows: tlmenu diagnostic for hang after redual
85812 85813	Windows: fix buffer overun in smanager when loggong server reject. Stop 'Lock 6' error message in Windows event log when starting realserv.
85814	Raw printing fixed on Windows 8 / 2012
85811	Correct return of file variable via a passed common variable assigned to a file variable
91280	Correct DataBasic IPM timeout of 255, and add timeout validation.
91282	Fix T-STATUS after T-DEVICE clears local definition
85788 91284	Ensure IPM sessions are correctly disconnected.
85825	Resolve problem where databases built on ZFS file system may be corrupt after system reboot.
91288	Windows: Fix DIR-VIEW problem where zero length files may not be visible.
91285	Enable millisecond time for DataBasic CONNECT/ACCEPT
85823	Enable tlrestore to move an open file.
85820	Ensure sort context workspaces are correctly cleaned up.
85826	Fix PCL2PDF graphic fills when watermark used
85828	Fix SIGSEGV when performing create of two indexes.
85809	Allow DataBasic Functions to use temp space.
91299	Fix bug in TCL stacker if max depth set to one.
91272	Correct fault in an internal support option of the BASIC verb.
91134	Enhance NC.LIST to display number of named descriptors.

85832	Enable generation of more than 100 clean logs in a day
85831	Add Reality SYSTEM(117) and SYSTEM(118) and mvBase SYSTEM(35) to return program line number.
91304	Correct capture of a PERFORM SYS if result has no trailing LF.
91308	Remove name restriction on External User Functions when not saving result.
85835	Correct test for single or double quotes for PROCS & TCL2 verbs.
91309	Fix COPY-LIST with valid source account and invalid destination filename.
85836	Windows: Fix GPF when trying to read non-existent binary DIRVIEW item.
85837	Stop 'Overwrite filesystem ...' prompt from mkdbase
85839 91314	RealEdit custom buttons
85838	DR: Recover form corrupt image response from master
91317	Fix hang of account restore when restoring DIR-VIEW
91324	Fix number of items displayed when using SELECT with View Compiled Programs option set.
91334	Fix database daemon abort on Linux when events enabled.
85845	Close vulnerability in mini web server where it could access any file on server.
91341	Correct DataBasic READPREV when used on a dynamic array.
91342	Clear confirm FD message in DESPOOLER.CONTROL file maintenance.

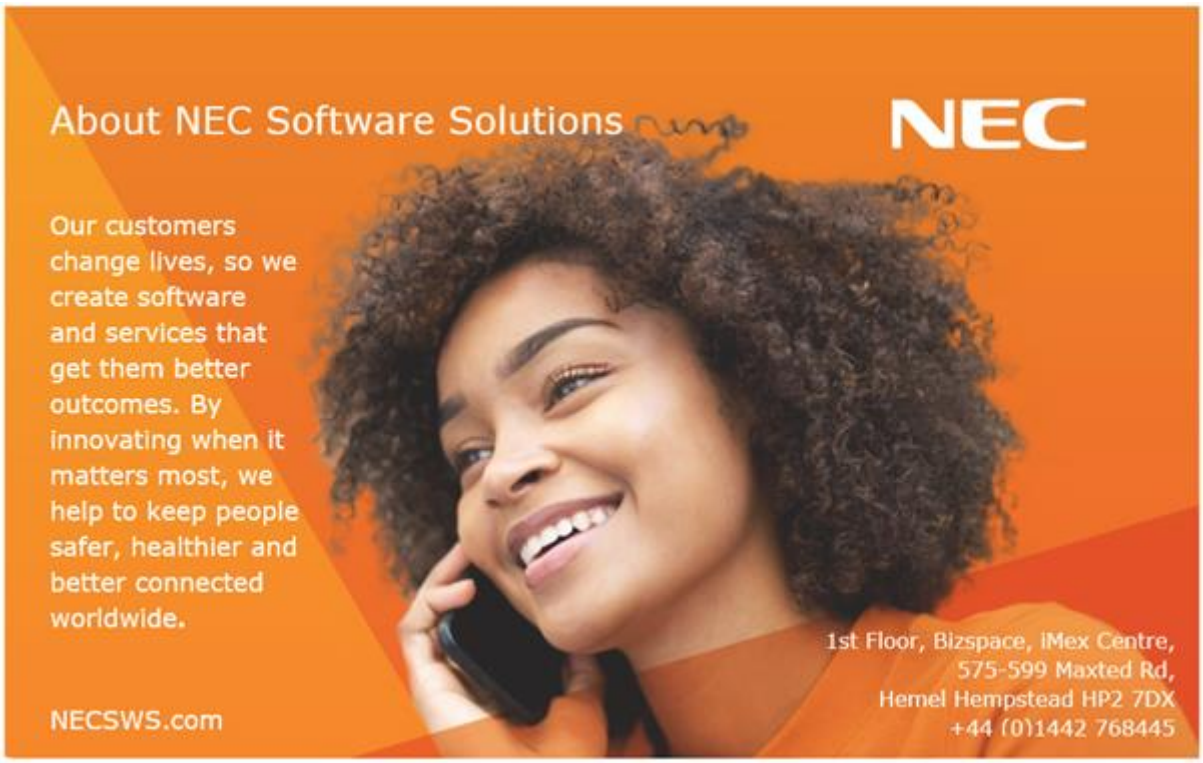
Section 6: Third Party Products

The following third party products are used within Reality:

- GNUmalloc (GNU Software Foundation);
- zlib compression library (GNU Software Foundation).
- DES Encryption library (Eric Young - eay@cryptsoft.com).

The following third party products may be included with Reality (depending on the operating system and the features selected):

- Perl scripting environment (GNU Software Foundation).
- Gzip compression software (GNU Software Foundation).
- GNU C-complier (GNU Software Foundation).
- Gdb Debugger (GNU Software Foundation).
- Adobe Acrobat document reader (Adobe Systems Inc.).
- Apache Tomcat™ web server (Apache Software Foundation).
- Jetty web server (Mort Bay Consulting).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