VR-Link 5.0 Release Notes

This release note provides the following release-specific information for VR-Link Release 5.0:

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Systems Supported

Table 1 lists the platforms currently supported by MÄK VR-Link 5.0. Please contact MÄK if you are interested in purchasing VR-Link for other platforms. Application code must be built with the indicated compilers in order to link to VR-Link libraries.

Table 1: Platforms supported

Platform	Compiler
Red Hat Enterprise Linux Workstation 4.0	default compiler
Red Hat Enterprise Linux Workstation 5.0, 6.0 (32 bit and 64 bit libraries)	default compiler
SUSE 11 Linux (32 bit and 64 bit libraries)	default compiler
PC with Windows XP/Vista/Windows 7	Microsoft Visual C++ 7.1 Microsoft Visual C++ 8.0 Microsoft Visual C++ 9.0 (32-bit and 64 bit) Microsoft Visual C++ 10.0 (32-bit and 64 bit) Microsoft Visual C++ 11.0 (32-bit and 64 bit)

Disk Space Requirements

Linux installations require approximately 502 MB of disk space for Red Hat WS 4.0 and 581 MB for Red Hat WS 5.0 and 6.0. On Windows, you need approximately 550 MB of disk space.

Compiler Compatibility on Windows

MÄK provides versions of product releases that have been compiled with different versions of Microsoft Visual C++. When you run MÄK products together, for example, the Logger and a VR-Vantage application, we strongly recommend that you run versions compiled with the same compiler. Mixing products compiled with different versions of the compiler on the same computer can result in program instability.

License Manager

To run the licensed version of VR-Link, you must install license management software. VR-Link 5.0 uses FLEXlm 11.11 for all versions except the Windows VC++ 7.1 version, which continues to use FLEXlm 11.6. If you are upgrading from a version of the VR-Link that used an older version of FLEXlm, you must upgrade your license management files. You do not need a new license. Licenses are forward compatible.

The License Manager files are not part of the VR-Link installer. You can download them at:

- Windows 32 bit: ftp://ftp.mak.com/out/MAKLicenseManager-win-setup.exe
- Windows 64 bit: ftp://ftp.mak.com/out/MAKLicenseManager-win64-setup.exe
- Linux: ftp://ftp.mak.com/out/MAKLicenseManager-linux-setup.tar.gz

A license manager FAQ is available at:

http://www.mak.com/support/faq.php#license

Network Compatibility

HLA only

VR-Link 5.0 is compliant with:

- RPR-FOM 0.5, 0.7, 0.8, 1.0, and a subset of 2.0 (draft 6, 14, and 17)
- MÄK RTI 2.x, 3.x, 4.x (HLA 1.3 and 1516-2000 only)
- MÄK RTI 4.0.4 or later (HLA Evolved)
- Pitch RTI 1.3 C++ interface.

Other RTIs that support the HLA 1.3 specification, the SISO DLC HLA API 1516 version of the IEEE 1516 specification (SISO-STD-004.1-2004), and HLA Evolved. To use an RTI with VR-Link it must use the same operating system and be built with the same compiler.

DIS only

VR-Link 5.0 supports DIS 4, 5, 6, and 7 and can therefore interoperate with DIS applications of any of these versions.

Backward Compatibility

In VR-Link 5.0, many header files have been renamed to make them much easier to find. Most files are now named by the class they represent. So, for example *DtReflectedEntityList* is now defined in *reflectedEntityList.h* instead of *reflEntList.h*. Therefore, existing projects are not compatible with VR-Link 5.0 without changes. We offer two options for migrating your VR-Link projects to VR-Link 5.0.

- Include a compatibility directory in your project.
- Update all header and source files using a provided script.

Using the Compatibility Directory

VR-Link 5.0 has a *compatibility* directory in its *include* directory. This directory has the same directory structure as the main *include* directory with header files that have the same names as previous versions of VR-Link. The header files in this directory do not duplicate the declarations in the renamed header files, they include the renamed header files themselves. To use the *./include/compatibility* directory, add it to your project's include directory list. You will not have to update the include statements in your project files.

Using the Migration Script

VR-Link provides a script (*./compatibility/updateIncludes.sh* on Linux, *./compatibility/updateIncludes.exe* on Windows) that will go through all of your source files and modify the include statements to reference the correct header files.

The update script uses the mapping files located in *./compatibility/mappings* to update include statements for the renamed VR-Link header files in a given set of source directories. The script searches all input directories for header (*.h and *.hpp), inline (*.inl), and source files (*.c, *.cpp, and *.cxx), and checks the include statements in those files against the mapping files. For the script to correctly map the header file names, VR-Link include statements must specify the VR-Link library path. This is so the scripts can identify which mapping file to use to map the include statement. Therefore, the base VR-Link include directory must be set as the include path for projects, instead of adding the individual library directories (*include/vl*, *include/mtl*, and so on.).

The script does the following:

- If a header file has been renamed, the header file in the include statement is renamed.
- If a header file has been removed, the include statement is removed.

The command syntax for the script is as follows:

```
updateIncludes [options] directory1 ... directoryn
```

where:

- `directory1 ... directoryn` is a list of directories in which the script will search for source and header files for updating.
- `-d` displays debug level information about the files and include statements as they are processed
- `-h` provides information about the various flags.
- `-v` displays slightly more verbose output than `-d`.
- `-x` tells the script to perform the replacements. If the script runs without the `-x` flag, it outputs the commands that will be run if the `-x` flag is specified. This is so you can verify the changes that are going to be made before the script changes all the files.

RPR FOM Versions Supported

VR-Link 5.0 has built-in support for versions 0.5, 0.7, 0.8, 1.0, and 2.0, drafts 6, 14, and 17, of the RPR FOM. By default, VR-Link 5.0 uses RPR FOM 1.0.

VR-Link does not officially support RPR FOM 2 Draft 18 at this time. However, the draft appears to be similar enough to RPR FOM 2 Draft 17 that the 2.0017 FOM Mapper may be used for federates wishing to interoperate with RPR FOM 2 Draft 18.

If you want to use a version of the RPR FOM other than 1.0, pass the version number (0.5, 0.7, 0.8, 2.0006, 2.0014, or 2.0017) to the *DtRprFomMapper* constructor and pass the resulting object to the *DtExerciseConn* constructor. Also, make sure you are using a federation execution name that corresponds to the right FED file. For example:

```
DtExerciseConn conn("VR-Link20017", "MyApp", new DtRprFomMapper(2.0017));
```

VR-Link examples like *f18* and *hlaNetdump* have a command line option, `--rprFomVersion`, that you can use to choose a RPR FOM version, using one of the version numbers listed in the previous paragraph.

RTI Support

VR-Link 5.0 has been tested with the MÄK RTI 4.2 for HLA 1.3, HLA 1516, and HLA Evolved. It has also been tested with Pitch's pRTI 4.3.1 for HLA 1.3 and HLA Evolved.

If you use the MÄK RTI, remember to make sure that the VR-Link can find your FED file or FDD file, and optional *rid.mtl*. Put the FED file or FDD file in the directory from which you are running, or set the environment variable RTI_CONFIG to the directory that contains it. See *MÄK RTI Reference Manual* for a list of the options for specifying the location of the *rid.mtl* file.

Applications built with VR-Link 5.0 for HLA can use any RTI that conforms to the relevant dynamic link compatible HLA standard (1.3, SISO DLC 1516, HLA Evolved) and was built using the same operating system and compiler.

New Features and Changes

VR-Link 5.0 is a feature release. It has the following new features and updates:

- Support for DIS 7 (DIS Evolved):
  - DIS 7 includes the ability to add arbitrary data to any DIS object or interaction. You can do this by creating a DtStandardVariableRecord that defines your data and then calling the addRecord() function in your PDU. All bundling work required to make this function correctly is done automatically. For more information, see the Class Documentation.
  - DIS 7 lets you define different thresholds depending on which class or entity type is being used. It also includes the ability to define a separate threshold if an object is not moving (velocity 0). The following functions defined in your publisher control this new function:

    static void setClassDfltTimeThreshold(DtTime threshold);

    static void setStationaryDfltTimeThreshold(DtTime threshold);

    static void setEntityTypeDfltTimeThreshold(int type, int domain, DtTime threshold);
  - New PDUs: Directed Energy Fire PDU, Entity Damage Status PDU, and Attribute PDU.
  - The IFF PDU has been greatly expanded to include support for Mode 5, Mode S, and other extensions.
- Support for Microsoft's Visual Studio 2012 compiler.
- All header files and CXX files have been updated to follow MÄK file naming conventions. For details about migrating to the newly named files, please see "Backward Compatibility," on page 4.

- The Code Generator has been greatly improved. It can now handle much more complex types including fixed and variable arrays as well as variants. We have also added the concept of a code generator project, which allows you to save projects and reload them. Finally, the Code Generator software now includes the ability to manually define your encoder and decoder if your FOM is doing more complex encoding and decoding than VR-Link can handle.
- New FOM Modules for MÄK's specific extensions to the RPR FOM when using HLA 1516.
- Deperecated unbundling methods were removed.

Documentation Updates

VR-Link Developers Guide has been updated to use the new header file and CXX file names.

Fixed Bugs

This release fixes the following issues that were problems in previous releases:

- VR-Link now allows run-time interoperability between federates that have loaded a 1.3-style FED file and federates that have loaded a 1516-style XML file that otherwise includes the same set of classes, attributes and parameters. You must use VR-Link calls, not direct RTI calls.
- Ownership gained did not set processUpdatesOn for single attributes when advisories were off. 50478
- Disabling requestObjectAttributeValueUpdate service did not disable for wait list objects. 50186
- DIS Netdump did not allow you to set a netmask. 49941
- F18 command line processor did not correctly initialize position. 49575
- DtElectromagneticEmissionPdu::printBeam did not print JammingModeSequence. 49568
- DtDisSocket::unbundle did not check for a minimum size. 49567
- When using UDP unicast and no application was listening on a remote port, VR-Link would somtimes print errors to the console, even thought this wasn't really an error condition. 49514
- The initial smoothed values for newly discovered entities were incorrect. 48890
- VR-Link's DtRadioTransmitterRepository set and retreived the frequency parameter in two 32 bit chunks. It is now set and retrieved as a 64 bit unsigned int. 48681
- HLA Evolved federates were not able to load HLA 1.3 FED files. 48354
- An exception was thrown when bad data was received. 48075
- The state repository retrieval methods were different in DIS and HLA for IFF. 48185

Known Problems

This release of VR-Link has the following known problems:

- The VR-Link Code Generator may have problems with complex FOMs. We have made every effort to verify that it works with a broad range of FOMS and FED files. However, we are unable to verify that it works for all FOMs. In addition, small errors in the FOM may prevent the Code Generator from correctly processing the FOM at all. If the Code Generator is not able to process your FOM, we would be happy to help. Please send a copy of your FOM to support@mak.com and we will work with you to correctly generate your FOM.
- VR-Link correctly encodes and decodes EnvironmentalProcess objects for RPR FOM 2, Draft 14. However, the RPR FOM specifies a way of encoding which prevents VR-Link from correctly decoding modified or custom EnvironmentalRecords. Unfortunately, many MÄK products built with VR-Link use customized EnvironmentalRecords. If you use these products or if you use customized records in your applications, please do not use the RPR FOM 2 Draft 14 FOM Mapper. This is not a problem in other FOM versions, and it has been resolved in future versions of the FOM.
- The RTI 1516 API specifies that all strings passed to and from the RTI are handled as wide strings. VR-Link (and the MÄK RTI) store strings internally as narrow strings. This means that true multibyte wide strings used by RTI Federates may not be handled correctly when received by VR-Link. VR-Link handles name reservation wide strings correctly, however, as this is a 1516-only function. VR-Link provides conversion functions from Wide To Narrow/Narrow to Wide string conversion in *vlStringUtil.h*.
- On non-windows platforms, the classes *DtSharedMemoryPoolManager* and *DtSharedMemoryPoolClient* (*vlShmPool.h*) sometimes have difficulty creating a large memory pool (greater than 1 MB) if the pool name is longer than two or three characters. The classes refuse to create the memory pool even if the requested pool is smaller than the system resource SHMMAX. Setting the pool name to fewer than three characters will work around this problem.
- Section 5.10, “Interoperability Between HLA 1.3 and IEEE 1516 Federates”, in *VR-Link Developers Guide* describes interoperability issues that arise when you try to run an HLA 1.3 federate with an IEEE 1516 federate. In particular it describes the requirement to use an identical FED or FDD file for all federates. In future releases, we intend to rectify this situation, and allow run-time interoperability between federates that have loaded a 1.3-style FED file and federates that have loaded a 1516-style XML file that otherwise includes the same set of classes, attributes and parameters.