TIBCO FTL® Message Switch Installation

Software Release 5.0.0
June 2016

Two-Second Advantage®

Important Information

Contents

TIBCO Documentation and Support Services

Documentation for this and other TIBCO products is available on the TIBCO Documentation site. This site is updated more frequently than any documentation that might be included with the product. To ensure that you are accessing the latest available help topics, please visit:

https://docs.tibco.com

Product-Specific Documentation

Documentation for TIBCO products is not bundled with the software. Instead, it is available on the TIBCO Documentation site.

The following documents for this product can be found on the TIBCO Documentation site:

- *TIBCO FTL Message Switch Installation*
- *TIBCO FTL Message Switch Release Notes*

How to Contact TIBCO Support

For comments or problems with this manual or the software it addresses, contact TIBCO Support:

- For an overview of TIBCO Support, and information about getting started with TIBCO Support, visit this site:

  http://www.tibco.com/services/support

- If you already have a valid maintenance or support contract, visit this site:

  https://support.tibco.com

  Entry to this site requires a user name and password. If you do not have a user name, you can request one.

How to Join TIBCOmmunity

TIBCOmmunity is an online destination for TIBCO customers, partners, and resident experts. It is a place to share and access the collective experience of the TIBCO community. TIBCOmmunity offers forums, blogs, and access to a variety of resources. To register, go to the following web address:

https://www.tibcommunity.com

Upgrading the Software

TIBCO FTL® Message Switch software includes upgrades to the nvOS operating system, and to TIBCO FTL software. To upgrade existing hardware to the current release, install the correct versions for both of these software components.

To determine the correct releases, see the readme file.

Downloading the Software Upgrade Packages

The appropriate software installation packages must be present on the target host computer. Obtain them from the TIBCO download site.

Procedure

1. Login to https://download.tibco.com.

   If you do not yet have a valid user name and password for the TIBCO download site, you can request them from: fulfillment@tibco.com.
2. Navigate to TIBCO FTL Message Switch-*release*.

   Navigate to TIBCO FTL Message Switch Software *release*.
3. Select the nvOS installation package:
   `TIB_nvos_`*`version`*`.pkg`
4. Click **Download**.
5. Select the TIBCO FTL installation package:
   `TIB_ftls_`*`version_platform`*`.zip`
6. Click **Download**.

Upgrading nvOS

Upgrade the nvOS operating system component on a TIBCO FTL Message Switch hardware platform.

Procedure

1. Copy the operating system package to the `/sftp/import/` directory.
2. Execute this command line (which requires `su` privileges):
   ```
   sudo nvOS_cli software-upgrade package import/TIB_nvos_version.pkg
   ```
   When the package installation is complete, the switch automatically reboots.
3. Accept the nvOS EULA.
   ```
   sudo nvOS_cli
   ```
   If the command line interface prompts you to accept a new EULA, you must accept it.
   Then exit the command line interface.
   ```
   exit
   ```

Upgrading TIBCO FTL Software

Upgrade the TIBCO FTL software component on a TIBCO FTL Message Switch hardware platform.

Prerequisites

You have downloaded the installation package `TIB_ftls_`*`release_platform`*`.zip`.

Procedure

1. Extract all files from the installation package `TIB_ftls_release_platform.zip`.
   Ensure that the installer, `TIB_ftls_release_ftl_ftl_release.bin`, is present.
2. Execute this command line (which requires `su` privileges):
   ```
   sudo sh TIB_ftls_release_ftl_ftl_release.bin
   ```
3. Display package information with this command:
   ```
   pkg list tibco-ftl-\*
   ```
   Verify that the package name `tibco-ftl-ftl_release` is present in the output.
4. Reboot the switch hardware.

Tuning TCP Performance on nvOS

System administrators can tune nvOS to reduce TCP packet latency.

Standard nvOS settings favor throughput and many connections. If latency is more important to your enterprise, consider tuning the settings below.

Always validate the results of tuning empirically. Before tuning, determine the empirical tests and evaluation criteria you will use to validate the results.

These values are a starting point for latency tuning. Empirical testing with reference to the specific criteria of your enterprise can often improve performance even further.

For more information see performance tuning guides for Solaris and OpenSolaris.

Prerequisites

Ensure that the appropriate version of nvOS is installed before tuning.

Procedure

1. Tune the system parameters.

   Add these settings to the configuration file `/etc/system`:

   ```
   set ip:ip_squeue_fanout = 1
   set ip:tcp_squeue_wput = 1
   set ip:ip_squeue_wait = 0
   set ddi_msix_alloc_limit = 8
   ```

   (These settings take effect after hardware restart.)

2. Tune the TCP device parameters.

   Use the **`ndd`** command.

   ```
   ndd -set /dev/tcp tcp_max_buf 16777216
   ndd -set /dev/tcp tcp_cwnd_max 8388608
   ndd -set /dev/tcp tcp_xmit_hiwat 4194304
   ndd -set /dev/tcp tcp_recv_hiwat 4194304
   ndd -set /dev/tcp tcp_conn_req_max_q 512
   ndd -set /dev/tcp tcp_conn_req_max_q0 4096
   ```

3. Restart the hardware.
4. Test the results, and iterate if needed.

Installing in a Virtual Machine for Development and Testing

You can develop and test applications on a virtual machine, for example, to avoid interfering with a production environment.

To create a virtual machine with TIBCO FTL Message Switch software, and to verify that it is installed correctly, complete *all* of the tasks that follow.

Downloading OpenIndiana

OpenIndiana is the guest operating system for virtual machines running TIBCO FTL Message Switch software. You can download OpenIndiana from the web.

OpenIndiana is similar to the nvOS operating system that runs on TIBCO FTL Message Switch hardware.

Obtaining a copy of OpenIndiana is a prerequisite for creating a virtual machine.

Procedure

- Download the Live DVD edition of OpenIndiana Build 151a8 Desktop DVD (32/64-bit x86) from the OpenIndiana web site.

  Place the download file, `oi-dev-151a8-live-x86.iso`, on the file system of the host computer where you will create the virtual machine.

Creating a New Virtual Machine

VMware provides a wizard to guide you in configuring and creating a virtual machine. This task guides you through the configuration choices.

Order of Task Steps

The VMware graphic user interface varies with the host operating system and with releases. As a result, the names of icons and menu items, the wording of wizard screens, and even the order of the following configuration steps could differ from those you see with your VMware product.

Prerequisites

- You have a VMware product installed on your host computer: for example, VMware Fusion for Mac OS X, or VMware Workstation for Windows.
- You have downloaded the OpenIndiana installation file to your host computer.

Procedure

1. Start the VMware product.
2. Create a new virtual machine. You can use any of the following methods:

   - Click **File > New Virtual Machine**.
   - Click the plus (+) icon.

   This step does not actually create the virtual machine, but instead starts a wizard to specify the configuration of a virtual machine. The final step in this task applies that configuration to create the virtual machine.

3. Determine the configuration type.

   In the New Virtual Machine Wizard, select a **Custom** configuration.

   Click **Next** to continue.

4. Determine the hardware compatibility.

   For best results, use the default values.

   Click **Next** to continue.

5. Choose OpenIndiana as the guest operating system.
   a) Select **Installer disc image file (iso)**.
   b) Specify the location of the OpenIndiana ISO file, `oi-dev-151a8-live-x86.iso`.

      (You downloaded that ISO file in the previous task.)
   c) Specify the type of the guest operating system.

      If VMware cannot determine the type of the guest operating system, it requests that you specify it explicitly. Select **Solaris** and specify the version as **Solaris 10 64-bit**.

   Click **Next** to continue.

6. Configure the parameters of the virtual machine.
   a) Name the virtual machine.

      Type a name for your virtual machine, and specify the file system location to store the image file. It is good practice to use the default location.

      Click **Next** to continue.
   b) Configure the processors.

      Configure a minimum of two total processor cores. Be sure to leave at least two free cores for the other activities of the host operating system and applications.

      Click **Next** to continue.
   c) Configure the memory size.

      For best results, use the default size, 2 GB. If resources are constrained, configure at least 1 GB.

      Click **Next** to continue.
   d) Select the network type.

      Select **Use network address translation (NAT)**.

      Click **Next** to continue.
   e) Select the I/O controller type.

      Select **LSI Logic**.

      Click **Next** to continue.

7. Configure the virtual disk.
   a) Select **SCSI** as the disk type.

      Click **Next** to continue.
   b) Select **Create a new virtual disk**.

      Click **Next** to continue.
   c) Specify 16 GB as the disk capacity.
   d) Select **Split virtual disk into multiple files**.

      Click **Next** to continue.
   e) Specify a base name for the disk virtual files.

      VMware computes a default base name from the virtual machine name.

      Click **Next** to continue.

8. Click **Finish** to create the virtual machine.

Installing OpenIndiana on a Virtual Machine

OpenIndiana provides an installation wizard to guide you in configuring and installing the operating system. This task guides you through the configuration choices.

Prerequisites

- You have created a new virtual machine.
- You have downloaded the OpenIndiana installation file to your host computer.

Input Destination

To send keyboard and mouse input to the virtual machine, either click in the virtual machine desktop, or press Ctrl+G.

To send keyboard and mouse input to the host computer, press Ctrl+Alt on Windows, or Ctrl +Command on Mac.

Procedure

1. Start the virtual machine. You can use any of the following methods:
   - Right-click the virtual machine in the Library pane, and click **Power > Start Up Guest**.
   - Click the **GUI** tab corresponding to the virtual machine, and click **Power on this virtual machine**.
   - Click the **GUI** tab corresponding to the virtual machine, and click **VM > Power > Start Up Guest**.
2. Accept the default OpenIndiana installation: `OpenIndiana Development oi_151.1.8 X86 (powered by illumos).`
3. Select a keyboard layout.
4. Select a language.
   The virtual machine GUI opens within the VMware window as a green desktop with icons.
5. Double-click the **Install OpenIndiana** icon.
   The installer wizard opens.
6. Accept the default configuration choices by clicking **Next**, except for the following parameters, which require your input:
   a) Click your geographical location on the map to select a time zone.
   b) Type appropriate values in the text fields to configure the root password, a user account, and the computer host name.
7. Click **Install** to begin installation.
8. Click **Reboot** to close the installer and start the operating system.
9. When rebooting completes, click **I Finished Installing** in the lower-right corner of the VMware window.
10. Type your password to login to the virtual machine.
11. Open a terminal window by clicking the icon at the top of the virtual machine desktop.
12. Start a superuser shell.
    ```
    sudo bash
    ```
13. Unmount the OpenIndiana CD image.
    ```
    umount /media/OpenIndiana_Live_X86/
    ```

14. Stop the virtual machine.
    Right-click the virtual machine in the Library pane, and click **Power > Shut Down Guest**, or use any equivalent method.
15. Unassign the CD ROM drive.
    a) In the **VMware** tab for the virtual machine, click **Edit virtual machine settings**.
    b) In the **Hardware** tab, select the CD/DVD device.
    c) Clear the **Connect at power on** check box.
    d) Select **Use physical drive** and **Auto detect**.
    e) Click **OK**.
16. Restart the virtual machine.
    Right-click the virtual machine in the Library pane, and click **Power > Start Up Guest**, or use any equivalent method.

Installing VMware Tools

VMware tools include useful features such as dragging files between the host and guest operating systems. To use these features, you must explicitly install them in your virtual machine.

Procedure

1. In the VMware window, click **VM > Install VMware Tools**.
2. Open a terminal window by clicking the icon at the top of the virtual machine desktop.
3. Start a superuser shell.
   ```
   sudo bash
   ```
4. Navigate to a temporary directory.
   ```
   cd /tmp
   ```
5. Extract the tools package.
   ```
   gunzip -c /cdrom/vmwaretools/vmware-solaris-tools.tar.gz | tar xf -
   ```
6. Run the tools installer.
   ```
   cd vmware-tools-distrib
   ./vmware-install.pl
   ```
   Accept the default value by pressing the Enter key for all configuration choices.
7. Stop the virtual machine.
   Right-click the virtual machine in the Library pane, and click **Power > Shut Down Guest**, or use any equivalent method.
8. Restart the virtual machine.
   Right-click the virtual machine in the Library pane, and click **Power > Start Up Guest**, or use any equivalent method.

Installing Development Tools

In this task you install the developer packages that you need to compile and run FTL applications.

Prerequisites

Procedure

1. Open a terminal window by clicking the icon at the top of the virtual machine desktop.
2. Start a superuser shell.
   ```
   sudo bash
   ```

3. Install the GCC development packages.

```
pkg install developer/gcc-3
pkg install developer/illumos-gcc
pkg install system/header
pkg install system/library/math/header-math
```

Installing JDK

The realm server requires the latest JDK.

Prerequisites

You must have downloaded JDK 1.8 to the host computer.

Procedure

1. Use the file browser on the virtual machine to open a download directory.
   a) Click the **Home** icon in the menu bar of the virtual machine.
   b) Click **File > Create Folder**, and name the new download folder.
   c) Double-click the download folder to open it.
   d) Drag the JDK package file from the download directory on the *host computer* to the download folder on the *virtual machine*.
2. Open a terminal window by clicking the icon at the top of the virtual machine desktop, and start a superuser shell.

```
sudo bash
```

3. Create the Java directory.

```
mkdir /opt/java
cd /opt/java
```

4. Install Java 1.8 JDK.

```
tar -zxf jdk-8ubuild_num-solaris-x64.tar.gz .
```

Installing TIBCO FTL Message Switch Software on a Virtual Machine

This procedure is the final task in creating a virtual machine for developing and testing software for TIBCO FTL Message Switch hardware.

The preceding tasks have prepared the environment for the installation of TIBCO FTL Message Switch software.

Prerequisites

The TIBCO FTL Message Switch software package is downloaded to the host computer. For instructions, see Downloading the Software Upgrade Packages, however, you do not need to download the nvOS operating system package.

Procedure

1. In the file browser, open the download folder you created when installing the Java JDK.
2. Drag the TIBCO FTL Message Switch package file from the download directory on the *host computer* to the download folder on the *virtual machine*.
3. Double-click the package file to open it.
4. Extract the files from the package.

a) Click **Extract**.
b) Select **Extract > All files**.
c) Click **Extract**.

5. Open a terminal window by clicking the icon at the top of the virtual machine desktop, and start a superuser shell.
```
sudo bash
cd /home/user_name/download_folder
```
6. Run the installer file
```
./TIB_ftls_release_ftl_ftl_release.bin
```
7. Clean up.
```
pkg unset-publisher tibco.com
```
8. Save the virtual image.
a) Shut down the operating system of the virtual machine.
In the OpenIndiana menu bar, click **System > Shut Down**.
b) Power-off the virtual machine.
Right-click the virtual machine in the Library pane, and click **Power > Power Off**.
c) Exit the VMware product.
File > Exit.
d) Archive a compressed copy of the directory that contains all the resource files of the virtual machine.
Use any standard archive tool, such as `zip` or `tar`.
The resulting archive file is a backup copy of the fully configured virtual machine.

What to do next

Test the virtual machine by running TIBCO FTL components and sample applications.

Running FTL Software on a Virtual Machine

To verify the installation on your virtual machine, run a realm server and sample applications.

Preparing an Environment for TIBCO FTL Software

Before running TIBCO FTL components and applications you must arrange the environment.

Prerequisites

You must have already installed development tools and the Java JDK.

Procedure

1. Open a terminal window by clicking the icon at the top of the virtual machine desktop, and start a shell.
```
bash
```
2. Set environment variables.
```
export JAVA_HOME=/opt/java/jdk1.8.0_build_num
export PATH=$JAVA_HOME/bin:/opt/gcc/4.4.4/bin:$PATH
export LD_LIBRARY_PATH="/opt/gcc/4.4.4/lib/amd64:$LD_LIBRARY_PATH"
export TIBFTL_ROOT=/opt/tibco/ftl/ftl_release
```
3. Run the FTL setup script.
```
cd /opt/tibco/ftl/ftl_release/samples
source setup
```

Running the Realm Server

The realm server is a central component of the product. Verify that it runs correctly.

Prerequisites

This task requires that you have arranged a terminal window with the appropriate environment.

Procedure

1. Start the realm server.
   ```
   cd /opt/tibco/ftl/ftl_release/samples/scripts
   ./ftlstart single realm
   ```
2. Verify that the realm server is running.
   a) Start the Firefox browser by clicking its icon in the menu bar of the virtual machine.
   b) Type the URL `localhost:8080`.
   If you see the FTL realm server home page, then the realm server is running correctly.

Running the C Samples

Build and run the sample subscribe and publish programs to verify product operation.

Prerequisites

This task requires that the realm server is running, and that you have arranged *two* terminal windows with the appropriate environment.

Procedure

1. Copy the samples to your home directory, or another working location.
   ```
   cd $HOME
   cp -r /opt/tibco/ftl/ftl_release/samples/ ./samples
   cd samples/src/c
   ```
2. Compile the samples.
   ```
   make TIBFTL_DIR=/opt/tibco/ftl/ftl_release
   ```
3. Start the subscriber program in the background.
   ```
   cd samples/src/c
   ./tibrecvex -c 10 http://localhost:8080 &
   ```
4. In the second terminal window, start the publisher program.
   ```
   cd samples/src/c
   ./tibsendex -c 10 http://localhost:8080
   ```
   The publisher program sends 10 messages, and the subscriber program receives and prints them. Then both programs exit.