ELEKTRON ZERO DAEMON VERSION 1.2 FOR ELEKTRON CONNECT

INSTALLATION GUIDE
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Chapter 1  Overview

1.1  Product Description

The Elektron Zero Daemon (EZD) provides network connectivity for existing Reuters Wire Format (RWF) and Market Feed (MF) applications using a near zero footprint datafeed delivery method. Client applications connect to the EZD to route traffic over the internet or via Delivery Direct. RSSL protocol is used in both instances, while internet connections use Secure Socket Layer (SSL) over TCP/IP and Delivery Direct uses TCP/IP connections over dedicated, leased telecommunication lines. This allows for almost the entire existing real-estate of RSSL-consuming applications such as TREP and RWF clients to obtain data through a low foot print delivery method with no application code changes other than a few, minor configuration changes.

EZD now supports both Elektron Connect via the internet and Delivery Direct as well as Elektron Test Environments connections.

1.2  New Features in this Release

EZD 1.2 provides the following new features:

• EZD allows the capability of non-encrypted RSSL connections through leased lines to a ThomsonReuters data center. This is an option for customers if internet delivery does not meet their needs

• Supports SSL4.0 protocol connections for applications built with SFC COM.
  Previous SSL connections used the SSL40BE protocol.

1.3  Supported Platforms

• Solaris 10 and 11 x86 64 bit
• Linux RHEL 6.0 (and above) 64 bit
• Oracle Linux 6.0 (and above) 64 bit.
• Windows Server 2008 (and above) 64 bit.

Note: 32 bit architectures are not supported at this time.

1.4  Supported Features

EZD supports the following key features:

• Encrypts and decrypts data using the Transports Layer Security protocol. This replaces the Secure Sockets Layer (SSL) protocol because of known security issues.

• Supports non-authenticating HTTP internet proxy connections; you can configure the application to connect to the final endpoint via an HTTP proxy (for internet connections).

• Enables zlib compression (default) for upstream RSSL/RWF connections.

• Supports the failback feature, which allows a channel connected to a providing source to determine if the channel is connected to the primary host of the providing service (for Elektron Connect only).
1.5 Audience

This manual is aimed at an audience of TREP and Elektron infrastructure experts familiar with networks that host Thomson Reuters server software including, but not limited to, the Advanced Data Hub (ADH), Advanced Distribution Server (ADS), and RTIC. It is presumed that readers have access to and are familiar with the ADS and ADH Software Installation Manuals.

1.6 Defaults and Conventions

Throughout this manual, in tables that describe the command options available for use with a tool, the default value is listed in parenthesis.

Additionally, this manual uses the following stylistic conventions:

- Path names and file names within the text of this document appear in a bold font. For example: `rmds.cnf`
- Commands to be entered by the user (exactly as shown) appear in orange, Lucida Console font. For example: `export RMDS_CONFIG`
- Variables, i.e. information that must be supplied by the user, are indicated by an italic font. For example: `tar -xvf tarfile_containing_load`
- Service names, names of configuration parameters, and configuration values appear in a bold font.
- Command line syntax, command examples, file listings, code samples, or system messages appear in a plain typewriter font with orange shading; e.g.:

```c
typedef struct
{
    unsigned char flags;
    unsigned char code;
} EXAMPLE_STRUCT;
```

1.7 Related Documentation

Refer to these documents in determining how to install, set up, and configure your TREP or Elektron system:

- *Advanced Distribution Server (ADS) Software Installation Manual* specific to the version that you use
- *Advanced Data Hub Server (ADH) Software Installation Manual* specific to the version that you use

1.8 Documentation Feedback

While we make every effort to ensure the documentation is accurate and up-to-date, if you notice any errors, or would like to see more details on a particular topic, you have the following options:

- Send us your comments via email at trepdocumentation@thomsonreuters.com.
- Mark up the PDF using the Comment feature in Adobe Reader. After adding your comments, you can submit the entire PDF to Thomson Reuters by clicking Send File in the File menu. Use the trepdocumentation@thomsonreuters.com address.
1.9 Glossary of Terms and Acronyms

<table>
<thead>
<tr>
<th>Term or Acronym</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>DD</td>
<td>(Thomson Reuters) Delivery Direct</td>
</tr>
<tr>
<td>EC</td>
<td>Elektron Connect</td>
</tr>
<tr>
<td>ETE</td>
<td>Elektron Test Environment</td>
</tr>
<tr>
<td>EZD</td>
<td>Elektron Zero Daemon proxy application</td>
</tr>
<tr>
<td>Failback</td>
<td>A feature to move the currently connected channel on a secondary host to the primary host.</td>
</tr>
<tr>
<td>Failover</td>
<td>A feature to successively attempt socket connections to hosts in the host list.</td>
</tr>
<tr>
<td>ILA</td>
<td>IDN Layer Address</td>
</tr>
<tr>
<td>RSSL</td>
<td>Reuters Sink Source Layer. A TCP/IP based protocol used by TREP. Used for user authentication.</td>
</tr>
<tr>
<td>RWF</td>
<td>Reuters Wire Feed. RWF is the format used on the wire and is used with the RSSL protocol.</td>
</tr>
<tr>
<td>SSL/SSLED</td>
<td>A Thomson Reuters term for Sink Source Layer. A TCP/IP based protocol used by TREP.</td>
</tr>
<tr>
<td>SSL</td>
<td>A widely recognized term for Secure Sockets Layer. An Encryption algorithm used over Internet connections.</td>
</tr>
<tr>
<td>TREP</td>
<td>Thomson Reuters Enterprise Platform</td>
</tr>
<tr>
<td>TLS</td>
<td>Transport Layer Security. An encryption algorithm used over Internet connections.</td>
</tr>
</tbody>
</table>

Table 1: Glossary of Acronyms and Terms

1.10 Included Utilities

The `rmdtestclient` utility is included as part of the EZD package to verify EZD operation. For Linux and Solaris, the `LD_LIBRARY_PATH` variable must be set to include the `libxerces` libraries that are included with the utility.

For more information on the operation of `rmdtestclient`, download the Infra Tools package and consult the appropriate documentation.
Chapter 2  Installation

2.1  Install Package

Download the EZD package from the Thomson Reuters GSG product repository. After downloading the EZD package, unzip its contents to the "/opt/thomsonreuters/SOFTWARE" directory.

2.2  OpenSSL Installation

To use EZD on Linux and Solaris, you must also have the latest version of the OpenSSL\(^1\) tool kit release 1.0. EZD uses this tool kit to establish Transport Layer Security (TLS) for encryption and decryption of all content on its connections. To use EZD on Windows platforms, use TLS provided through the OS and Internet Explorer.

**Note:** This is not required if connecting via Thomson Reuters Delivery Direct because Secure Socket Layer is not employed for this delivery method.

2.2.1  OpenSSL Vulnerabilities

Thomson Reuters is aware of several known vulnerabilities in the SSL protocol distributed through OpenSSL packages. Because of these vulnerabilities, Thomson Reuters is no longer using SSLv3 and instead uses TLS for encrypted connections. When using OpenSSL on your machine, verify that it is using a version that does not contain these vulnerabilities. Refer to the following technical bulletins for more information:

- 7234: Thomson Reuters Trade Notification - SSLv3 Disablement due to Internet vulnerability, also known as POODLE (https://customers.reuters.com/a/support/NotificationService/ViewProduct.aspx?id=R0/7234)
- Also refer to the Thomson Reuters Technical Bulletin available on the Customer Zone at: https://customers.reuters.com/a/support/paz/pazDocs.aspx?pId=9936&dId=565065

2.2.2  Linux Vulnerabilities

Thomson Reuters is aware of the ‘GHOST bug in the `__nss_hostname_digits_dots()` function of glibc that can be triggered (locally or remotely) via the `gethostbyname*()` functions used to resolve hostnames. Refer to the following Thomson Reuters Technical Bulletin available on the Customer Zone for more information: https://customers.reuters.com/a/support/paz/pazDocs.aspx?pId=9936&dId=566497

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\(^1\) https://www.openssl.org/
2.2.3 OpenSSL Setup on Linux

Verify you are using the most secure version of OpenSSL. Contact your Linux vendor to see whether any security alerts are active and to determine the latest available OpenSSL package that they support.

- For Oracle Linux, go to http://public-yum.oracle.com and then browse the repository to locate the latest packages for the specific install version.

You can use the yum command to install, update, or query version information for OpenSSL. To determine whether OpenSSL is already installed on a Red Hat or Oracle Linux machine, use the yum search openssl command. This shows any installed OpenSSL packages.

- If the OpenSSL package is not installed, to install the package run: yum install package_name (for packages and their names, refer to the Red Hat or Oracle resources listed above).
- If OpenSSL is installed, to determine whether updates are available for the OpenSSL library, run: yum check-update | grep openssl. The command yum update package_name updates the specified package.

2.2.4 OpenSSL Setup on Solaris X64

Verify you are using the most secure version of OpenSSL by going to the Oracle/Sun website at http://www.oracle.com (you can find any security alerts and the latest available OpenSSL packages they support at Oracle’s website). To determine if OpenSSL is already installed, run the command: /usr/sfw/bin/openssl version.

- If it is not installed, download a binary package from your Solaris vendor.
- If it is installed, apply any necessary patches or updates using the patchadd command. Full capabilities of patchadd are documented at http://docs.oracle.com/cd/E19528-01/819-4683/gfurn/index.html.

Note: Although OpenSSL 1.0.0h or later is recommended, you can also use 64-bit OpenSSL 0.9.7 with EZD running on Solaris. Refer to Solaris Operation with Installed OpenSSL libraries.

2.2.5 Downloading and Building Source

As an alternative approach, download the full source code and compile it for a particular platform. Source code packages are available at http://www.openssl.org/source.

After downloading, follow the included instructions to configure and build for your desired platform.

2.2.6 Windows WinInet

EZD on Windows does not use OpenSSL, but instead uses encryption through the Windows WinInet API. No OpenSSL libraries are required to be downloaded for Windows.
2.3 Linux and Solaris Installation

Verify that you have completed the steps to perform OpenSSL installation according to your operating system.

Refer to the following sections to install EZD:

- Section 2.5, Configuration
- Section 2.6, Installation with Actual Experience Plc Perception Agent

2.3.1 Tuning Linux TCP buffers

Edit the `/etc/sysctl.conf` file to contain the following settings:

```plaintext
net.core.wmem_max = 419304
net.core.wmem_default = 2097152
net.core.rmem_max = 4194304
net.core.rmem_default = 2097152
net.ipv4.tcp_rmem = 4096 2097152 4194304
net.ipv4.tcp_wmem = 4096 2097152 4194304
net.ipv4.tcp_mem = 4096 2097152 4194304
```

To make this change permanent, reboot or execute `/sbin/sysctl -p` to reread the updated values.

2.3.2 Tuning Solaris TCP buffers


```plaintext
/usr/sbin/ndd -set /dev/tcp tcp_max_buf 4194304
/usr/sbin/ndd -set /dev/tcp tcp_recv_hiwat 65535
/usr/sbin/ndd -set /dev/tcp tcp_xmit_hiwat 65535
/usr/sbin/ndd -set /dev/udp udp_max_buf 4194304
/usr/sbin/ndd -set /dev/udp udp_xmit_hiwat 400000
/usr/sbin/ndd -set /dev/udp udp_recv_hiwat 400000
```
2.4 Windows Installation

2.4.1 Install Runtime Libraries

The Windows EZD binary requires that Microsoft Visual C++ 2010 Redistributable Package (x64) runtime libraries are installed on your system. Follow the instructions as provided in the following link and install the package.


2.4.2 Configure Outgoing Internet Connections

Some Microsoft Internet Explorer installations have set a limit on the number of outgoing Internet connections. This may limit EZD connections to the Internet. To resolve this issue, follow the instructions from the following Knowledge Base article: http://support2.microsoft.com/kb/282402.

Note: This is not required if connecting via Thomson Reuters Delivery Direct because Secure Socket Layer is not employed for this delivery method.

2.4.3 Automatic Configuration for Windows

The install script file for the Windows configuration is called ezdSetup.bat. Run the install script from a command prompt with administrator privileges. The install script creates the configuration file (ezd.cnf) in C:\ThomsonReuters\ezd\config directory.

2.4.4 Verify Security Protocols

ThomsonReuters HMDS endpoints use TLS security for the encrypted connections. Verify your security settings by going to Control Panel > Internet Settings > Advanced, and scroll down to Security settings. Verify that TLS1.1 and TLS1.0 are set.

Note: This is not required if connecting via Thomson Reuters Delivery Direct because Secure Socket Layer is not employed for this delivery method.
2.5   Configuration

The EZD application requires a license to operate (for details, refer to Section 2.5.8), as well as a user configuration file that maps usernames to their associated ILA (for details, refer to Section 2.8.1).

2.5.1   Automatic Configuration

An install script is included to automate the installation process for Linux and Solaris machines. Execute the ezdSetup.sh script to create the ezd.cnf and user configuration files. The user is prompted for non-default parameters, such as the proxy configuration. For details, refer to Section 2.7.

2.5.2   Advanced Configuration

A sample configuration file (ezd.cnf) is included in the installation so that you can tune the EZD application. To connect the EZD to the hosted Thomson Reuters centers, you must edit this file. In addition to this, if you are using EZD to connect to Elektron Test Environments (ETE), refer to the EZD for ETE Configuration Guide on the Thomson Reuters Customer Zone (available June 2015).

Refer to Table 2.

<table>
<thead>
<tr>
<th>PARAMETER</th>
<th>VALUE TYPE</th>
<th>DEFINITION</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>ezd</em>bindMainThread</td>
<td>String</td>
<td>Use this parameter to bind the EZD process thread. The parameter follows the conventions of TREP systems with the following syntax: P:0 C:0 T:0</td>
</tr>
<tr>
<td><em>ezd</em>licenseFilePath</td>
<td>String</td>
<td>Specifies the path to the Thomson Reuters license. The default license filename is ezd_licensefile.txt.</td>
</tr>
<tr>
<td><em>ezd</em>userILAFile</td>
<td>String</td>
<td>Specifies the path to the user ILA configuration file.</td>
</tr>
<tr>
<td><em>ezd</em>libNameOpenSSL</td>
<td>String</td>
<td>Conditional. Specifies the name of the OpenSSL library installed on the machine, if different than libssl.so.10 (Linux) or libssl.so.1.0.0 (Solaris). EZD uses this parameter to load the specified library if a newer version is installed on the machine or if the default library is not present. <strong>Note:</strong> Only 64 bit libraries are supported.</td>
</tr>
<tr>
<td><em>ezd</em>libNameCrypto</td>
<td>String</td>
<td>Conditional. The name of the cryptographic library installed on the machine, if different than libcrypto.so.10 (Linux) or libcrypto.so.1.0.0 (Solaris). EZD uses this parameter to load the specified library if a newer version is installed on the machine or if the default library is not present. <strong>Note:</strong> Only 64 bit libraries are supported.</td>
</tr>
</tbody>
</table>

Table 2: Main EZD Configuration Parameters
2.5.3 Customizing the RSSL Server

The EZD application creates an RSSL server component to accept RWF/RSSL client connections. The RSSL server uses the configuration file to configure the incoming RWF/RSSL client connections. For advanced configuration settings, refer to the Advanced Distribution Server (ADS) Software Installation Manual specific to the version that you use or contact your local Thomson Reuters support representative.

By default, the RSSL Server listens to connections on port 14002. If you want to use a different port, edit the rssiPort parameter (in ezd.cnf) to set the desired port number.

*ezd*snkRsslServer*rsslPort : 14002

2.5.4 Customizing Internet Connections

Every connection to the EZD creates an outgoing connection to a hosted Thomson Reuters system. By default, an outgoing connection compresses data using zlib compression techniques and uses Transport Layer Security (TLS) encryption for internet connections. An outgoing connection must be configured to connect to the Thomson Reuters hosted system.

<table>
<thead>
<tr>
<th>PARAMETER</th>
<th>VALUE TYPE</th>
<th>DEFINITION</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>ezd</em>secureConnection*hostList:</td>
<td>String</td>
<td>Specifies the list of hosts to connect the EZD. The first host in the list specifies the primary host connection and is used as the primary host for the failback feature. If the connection to the primary host fails, EZD attempts connections to the subsequent hosts in the list until a connection is successful. For details on configuring this parameter, refer to Section 2.5.6.1.</td>
</tr>
<tr>
<td><em>ezd</em>secureConnection*port:</td>
<td>Number</td>
<td>Specifies the port number on the hosted Thomson Reuters system that accepts connections. Thomson Reuters recommends using 443 for the configuration parameter. Default setting is 443.</td>
</tr>
<tr>
<td><em>ezd</em>secureConnection*proxyHostName</td>
<td>String</td>
<td>Specifies the hostname, IP address, or URL of an outgoing proxy. For windows connections, proxyHostName should not be configured in ezd.cnf. EZD uses the proxy configuration settings from Internet Explorer.</td>
</tr>
<tr>
<td><em>ezd</em>secureConnection*proxyPort</td>
<td>Number</td>
<td>Specifies the port number of the proxy. For windows connections, proxyPort should not be configured in ezd.cnf. EZD uses the proxy configuration settings from Internet Explorer.</td>
</tr>
<tr>
<td><em>ezd</em>secureConnection*reencodeSrcDir</td>
<td>Boolean</td>
<td>Sets whether EZD re-encodes incoming source directory messages to change service names unknown to clients into names that clients can understand. Default is True.</td>
</tr>
</tbody>
</table>

**Warning!** Do not change this parameter.

Table 3: Secure Connections
### Table 3: Secure Connections

<table>
<thead>
<tr>
<th>PARAMETER</th>
<th>VALUE TYPE</th>
<th>DEFINITION</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>ezd</em>secureConnection*tcpRecvBufSize</td>
<td>Number</td>
<td>Specifies the number of bytes to allocate to the TCP receive buffer. If you do not modify your system settings to allow larger buffers, set this parameter to <strong>2048000</strong>.</td>
</tr>
<tr>
<td><em>ezd</em>secureConnection*tcpSendBufSize</td>
<td>Number</td>
<td>Specifies the number of bytes to allocate to the TCP send buffer. If you do not modify your system settings to allow larger buffers, set this parameter to <strong>2048000</strong>.</td>
</tr>
<tr>
<td><em>ezd</em>secureConnection*tryNextHostTime</td>
<td>Number</td>
<td>If the current host fails or is unavailable, this parameter specifies (in seconds) the time EZD waits before trying the next host in the <strong>hostList</strong>. Default setting is <strong>25</strong>.</td>
</tr>
<tr>
<td><em>ezd</em>secureConnection*old_serviceName</td>
<td>String</td>
<td>This parameter changes the service name provided in the source directory message to a known name used by the clients. Many clients may want to change the default incoming service name (e.g. IDN_RDF) to something different (e.g. ELEKTRON_DD). This parameter allows the incoming service to be renamed so that client applications do not have to change their configuration files. In version 1.0, <strong>clientServiceName</strong> was named <strong>appServiceName</strong>. It was renamed to reduce confusion from corresponding TREP operations.</td>
</tr>
</tbody>
</table>

[Link to the next page]
2.5.5 Customizing Delivery Direct Connections

By default, the EZD installation configures EZD to connect to the internet. Internet connectivity allows clients to remove their leased telecommunication lines that are connected to ThomsonReuters. However, a client may wish to retain these leased lines and use EZD to connect directly to the ThomsonReuters hosted endpoint. This connection method is called Delivery Direct. When configuring the EZD to use the Delivery Direct method, a few parameters must be changed. Refer to Table 4.

**Note:** Only one exclusive connectivity mode is used, either secure internet or delivery direct upstream connection.

<table>
<thead>
<tr>
<th>PARAMETER</th>
<th>VALUE TYPE</th>
<th>DEFINITION</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>ezd</em>secureConnection*hostList:</td>
<td>IP Address</td>
<td>Refer to Section 2.5.6.2 Hosts for Delivery Direct Connections.</td>
</tr>
<tr>
<td><em>ezd</em>secureConnection*port:</td>
<td>Number</td>
<td>Specifies the port number on the hosted Thomson Reuters system that accepts connections. The Delivery Direct port number is 14002.</td>
</tr>
<tr>
<td>! <em>ezd</em>secureConnection*proxyHostName</td>
<td>IP Address or URL</td>
<td>Comment out this parameter by inserting a “!” at the beginning of the line. If you switch to the secure internet connectivity mode, re-enable this parameter.</td>
</tr>
<tr>
<td>! <em>ezd</em>secureConnection*proxyPort</td>
<td>Number</td>
<td>Comment out this parameter by inserting a “!” at the beginning of the line. If you switch to the secure internet connectivity mode, re-enable this parameter.</td>
</tr>
<tr>
<td><em>ezd</em>secureConnection*connectionType : 0</td>
<td>Number</td>
<td>Value is 0</td>
</tr>
<tr>
<td></td>
<td></td>
<td>This parameter changes the connection type of the upstream connection to use a raw unencrypted RSSL socket instead of an encrypted RSSL socket using TLS security. Encryption should not be necessary when using dedicated telecommunication lines with VPN.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>If you switch to the secure Internet connectivity mode, comment out this parameter.</td>
</tr>
</tbody>
</table>

Table 4: Delivery Direct Connection Parameters
2.5.6 Host Configuration

The particular Thomson Reuters hosted system that you connect to depends on the region where your site is located. You should also use a backup host. Configure the host in the *ezd*secureConnection*hostList* parameter.

The following hosts are for Elektron Connect only. For Elektron Test Environments hosts, refer to the *EZD for ETE Configuration Guide* on the Thomson Reuters Customer Zone (available June 2015).

2.5.6.1 Hosts for Secure Internet Connections

Use the following host configuration depending on your region:

- **EMEA:** emea1.streaming-ec.cp.thomsonreuters.com, emea2.streaming-ec.cp.thomsonreuters.com
- **APAC:** apac1.streaming-ec.cp.thomsonreuters.com, apac2.streaming-ec.cp.thomsonreuters.com
- **AMERS:** amers1.streaming-ec.cp.thomsonreuters.com, amers2.streaming-ec.cp.thomsonreuters.com

2.5.6.2 Hosts for Delivery Direct Connections

Use the following host configuration depending on your region:

- **EMEA:** emea1.streaming-ec.cp.extranet.thomsonreuters.biz, emea2.streaming-ec.cp.extranet.thomsonreuters.biz
- **APAC:** apac1.streaming-ec.cp.extranet.thomsonreuters.biz, apac2.streaming-ec.cp.extranet.thomsonreuters.biz
- **AMERS:** amers1.streaming-ec.cp.extranet.thomsonreuters.biz, amers2.streaming-ec.cp.extranet.thomsonreuters.biz

2.5.7 User configuration file

The user configuration file maps user names to associated ILA values. The user configuration filepath must be specified in the EZD configuration file (*ezd.cnf*). For details on setting up a user configuration file, refer to Chapter 4 Permissioning/Authenticaon.

Example:

```text
*ezd*userILAFile : user_list.txt
```

2.5.8 License File

The EZD application requires a license from Thomson Reuters to operate. The license filepath must be specified in the EZD configuration file (*ezd.cnf*). Contact a Thomson Reuters support representative to obtain a license for this product.

Example:

```text
*ezd*licenseFilePath : ezd_licensefile.txt
```

Install the license file in the following location:

- **Linux/Solaris:** /opt/thomsonreuters/SOFTWARE/globalconfig/
- **Windows:** C:\ThomsonReuters\ezd1.2\config\
2.6 Installation with Actual Experience Plc Perception Agent

**Note:** Installed for Elektron Connect deployments only. Do not use for Elektron Test Environments.

Linux packages come with a 3rd party tool from Actual Experience called Perception Agent. This tool monitors internet performance with Thomson Reuters hosted sites. The Perception Agent installation software requires the EZD license. If the license is not available, the Perception Agent can be installed at a later time. The Perception Agent is installed as part of the EZD install scripts. To install the Perception Agent software manually, refer to Appendix E Actual Experience Plc. Perception Agent.

2.7 Configuring EZD through the Install Script

Configure the EZD parameters during EZD installation using the EZD install script file (`ezd_install.cfg`). Follow the prompts during the install and populate the applicable fields.

▶ **Run the EZD install script by entering the following command:**

Specify the install script file on the command line:

```
zedSetup.sh
```

For a sample install script display, refer to Appendix D Sample Install Script.
2.8 Initialization

2.8.1 OpenSSL Library Loading

The EZD application uses dynamic loading of the OpenSSL libraries. In Solaris and other Unix environments, the OpenSSL libraries may not be part of the library search path. To fix this, export the environment variable (LD_LIBRARY_PATH) and edit it to contain the path to the libssl and libcrypto libraries.

The EZD application expects default libraries of libssl.so.10 and libcrypto.so.10 for Linux, or libssl.so.1.0.0 and libcrypto.so.1.0.0 for Solaris. If newer libraries are installed, refer to Section 2.2 for details on loading non-default OpenSSL libraries for the EZD application.

2.8.2 Starting the EZD in Linux or Solaris

Note: Before starting the EZD, complete Section 2.8.1 to ensure that the user_file and license are configured.

Run the EZD by entering the following command:

Specify the start file on the command line:

```
start_ezd
```

2.8.3 Starting the EZD in Windows

Note: Before starting the EZD, complete Section 2.8.1 to ensure that the user_file and license are configured.

Run the EZD by entering the following command:

In Windows, open a command window in Administrator mode. This is necessary to connect to shared memory.

Start EZD on the command line:

Warning! If entering ezd.exe on the command line, you must specify either the -nodaemon flag or the -c config_file option to prevent a startup error.

```
ezd.exe -nodaemon
```
Chapter 3  Functionality

3.1  Connection Handling

The EZD application includes the option to create an RSSL server to handle incoming RSSL/RWF client connections and/or an SSL server to handle incoming SSL 4.0/4.0BE client connections (SSL 4.5 client connections are not compatible with EZD at this time). Each connection creates a corresponding upstream RSSL connection over TLS encryption to a Thomson Reuters hosted site. If EZD fails to connect to a Thomson Reuters hosted system, EZD sends a failure status message to the client. EZD logs incoming and outgoing connections/drops into a log file. Clients are responsible for reconnecting.

Outgoing connections use the Transport Layer Security (TLS) Encryption protocol over the internet.

3.2  Ping Handling

EZD implements incoming and outgoing pings for the connection channels. You can configure the connection parameters to adjust the frequency of pings. Ping messages are not sent in instances that contain the same traffic flow. For example, an outgoing ping message is not sent while EZD is sending outgoing messages. However, incoming ping messages on that channel should be expected because the client rarely sends messages upstream.

3.3  Message Handling

EZD is a pass-through proxy for incoming and outgoing messages. If needed, you can configure EZD to assign an alias to the service name (provided by the Thomson Reuters hosted systems) in incoming source directory messages to names used by clients. For details on the aliasing operation, refer to Section 2.5.4.

*ezd*secureConnection*IDN_RDF*clientServiceName: ELEKTRON_DD

3.4  Proxy support

EZD supports non-authenticating HTTP internet proxy connections. Set the proxy information in the configuration file.

3.5  Required files

The EZD application requires the following files:

- Configuration file (ezd.cnf)
- License file (ezd_licensefile.txt)
- User-mapping file (user_list.txt)
Chapter 4    Permissioning/Authentication

With EZD, you can translate user names to an ILA address using the user_list.txt configuration file. The user_list.txt configuration file uses the syntax: user_name,ILA_code with each user listed on a unique line. For example:

```
bob,#22C02C
bill,#22C002
joe,#22C004
root,#226B70
```

The assigned ILA addresses are compared against the license:

- If the ILA is in the license, the user has permissions to log into the hosted site.
- If the ILA does not match an ILA in the license, the connection is rejected.

**Note:** Letters in the ILA codes listed in user_list.txt must be uppercase letters.
Chapter 5 Configuring ADH or ADS/POP Connections

Accept connections from the ADH and/or ADS/POP by configuring a route to the EZD on the ADH and/or ADS/POP. Create a route by using standard route configuration parameters (edit the route options listed below).

The following example creates a route called "route1.route".

```
*adh*route1.route*hostList : EZD hosted machine, typically localhost
*adh*route1.route*port : EZD rsslServer port, typically 14002
*adh*route1.route*protocol : rssl
*adh*route1.route*requestTimeout : 30
*adh*route1.route*serviceList : ELEKTRON_DD
*adh*route1.route*userName : A permissioned user name with an associated ILA code
*adh*route1.route*SERVICE*cacheLocation: ssl
```
Chapter 6  Reuters SSL Connections

6.1  Introduction

EZD includes support for Reuters SSL 4.0 and 4.0BE connections from the application. EZD is responsible for converting Reuters SSL messages received from the application to RSSL and then sending them upstream over a secure channel. EZD also converts RSSL messages received over secure channels to Reuters SSL before handing them over to the application.

**Note:** EZD does not support SSL 4.5 connections.

Refer to Table 5 through Table 8 for supported messages.

<table>
<thead>
<tr>
<th>SSL MESSAGES</th>
<th>CORRESPONDING RSSL MESSAGES</th>
</tr>
</thead>
<tbody>
<tr>
<td>IPC_PT1_MOUNT_REQ</td>
<td>RsslRequestMessage</td>
</tr>
<tr>
<td></td>
<td>msgClass : RSSL_MC_REQ</td>
</tr>
<tr>
<td></td>
<td>domainType : RSSL_DMT_LOGIN</td>
</tr>
<tr>
<td>IPC_PT1BE_SRC_TABLE_REQ</td>
<td>RsslRequestMessage</td>
</tr>
<tr>
<td></td>
<td>msgClass : RSSL_MC_REQUEST</td>
</tr>
<tr>
<td></td>
<td>domainType : RSSL_DMT_SOURCE</td>
</tr>
<tr>
<td>IPC_PT1BE_CONFIG_REQ</td>
<td>Dictionaries are pre loaded for EZD so EZD echos back with the</td>
</tr>
<tr>
<td></td>
<td>dictionaries it already has loaded.</td>
</tr>
<tr>
<td>IPC_PT1BE_PING_RESPONSE</td>
<td>Pings from application are responded to by EZD they are not</td>
</tr>
<tr>
<td></td>
<td>forwarded upstream.</td>
</tr>
<tr>
<td>IPC_PT1BE_OPEN_REQ</td>
<td>RsslRequestMessage</td>
</tr>
<tr>
<td></td>
<td>msgClass: RSSL_MC_REQUEST</td>
</tr>
<tr>
<td></td>
<td>domainType : RSSL_DMT_MARKET_PRICE</td>
</tr>
<tr>
<td>IPC_PT1BE_CLOSE_REQ</td>
<td>RsslCloseMessage</td>
</tr>
<tr>
<td></td>
<td>msgClass : RSSL_MC_CLOSE</td>
</tr>
<tr>
<td></td>
<td>domainType: RSSL_MC_MARKET_PRICE</td>
</tr>
<tr>
<td>IPC_PT1BE_PRIORITY_REQ</td>
<td>RsslRequestMessage</td>
</tr>
<tr>
<td></td>
<td>msgClass : RSSL_MC_REQUEST</td>
</tr>
<tr>
<td></td>
<td>domainType : RSSL_DMT_MARKET_PRICE</td>
</tr>
<tr>
<td></td>
<td>Following flags are set on request message</td>
</tr>
<tr>
<td></td>
<td>RSSL_RQMF_NO_REFRESH, RSSL_RQMF_HAS_PRIORITY</td>
</tr>
<tr>
<td>IPC_PT1BE_INSERT</td>
<td>RsslPostMessage</td>
</tr>
<tr>
<td></td>
<td>msgClass : RSSL_MC_POST</td>
</tr>
<tr>
<td></td>
<td>domainType : RSSL_DMT_MARKET_PRICE</td>
</tr>
</tbody>
</table>

Table 5: Supported SSL Messages from APP to EZD
### Table 6: Supported SSL Messages from EZD to APP

<table>
<thead>
<tr>
<th>RSSL Messages from Upstream</th>
<th>Corresponding SSL Messages</th>
</tr>
</thead>
<tbody>
<tr>
<td>RsslRefreshMessage</td>
<td>IPC_PT1_MOUNT_ACK</td>
</tr>
<tr>
<td>msgClass: RSSL_MC_REFRESH</td>
<td></td>
</tr>
<tr>
<td>domainType: RSSL_DMT_LOGIN</td>
<td></td>
</tr>
<tr>
<td>RsslStatusMessage</td>
<td>IPC_PT1_MOUNT_NAK</td>
</tr>
<tr>
<td>msgClass: RSSL_MC_STATUS</td>
<td></td>
</tr>
<tr>
<td>domainType: RSSL_DMT_LOGIN</td>
<td></td>
</tr>
<tr>
<td>RsslRefreshMessage</td>
<td>IPC_PT1_BE_SERVICE_INFO</td>
</tr>
<tr>
<td>msgClass: RSSL_MC_REFRESH</td>
<td></td>
</tr>
<tr>
<td>domainType: RSSL_DMT_SOURCE</td>
<td></td>
</tr>
<tr>
<td>RsslUpdateMessage</td>
<td>IPC_PT1_BE_SERVICE_INFO</td>
</tr>
<tr>
<td>msgClass: RSSL_MC_UPDATE</td>
<td></td>
</tr>
<tr>
<td>domainType: RSSL_DMT_SOURCE</td>
<td>IPC_PT1_BE_GROUP_STATUS</td>
</tr>
<tr>
<td></td>
<td>IPC_PT1_BE_GROUP_MERGE</td>
</tr>
<tr>
<td>RsslRefreshMessage</td>
<td>IPC_PT1_BE_IMAGE</td>
</tr>
<tr>
<td>msgClass: RSSL_MC_REFRESH</td>
<td></td>
</tr>
<tr>
<td>domainType: RSSL_DMT_MARKETPRICE</td>
<td></td>
</tr>
<tr>
<td>RsslUpdateMessage</td>
<td>IPC_PT1_BE_UPDATE</td>
</tr>
<tr>
<td>msgClass: RSSL_MC_UPDATE</td>
<td></td>
</tr>
<tr>
<td>domainType: RSSL_DMT_MARKETPRICE</td>
<td></td>
</tr>
<tr>
<td>RsslStatusMessage</td>
<td>IPC_PT1_BE_STATUS</td>
</tr>
<tr>
<td>msgClass: RSSL_MC_STATUS</td>
<td></td>
</tr>
<tr>
<td>domainType: RSSL_DMT_MARKETPRICE</td>
<td></td>
</tr>
<tr>
<td>RsslAckMessage</td>
<td>IPC_PT1_BE_INSERT_ACK</td>
</tr>
<tr>
<td>msgClass: RSSL_MC_ACK</td>
<td></td>
</tr>
<tr>
<td>domainType: RSSL_DMT_MARKETPRICE</td>
<td>IPC_PT1_BE_INSERT_NAK</td>
</tr>
<tr>
<td>EZD sends IPC_PT1_BE_PING message to the application periodically based on the value of the parameter <strong>pingInterval</strong>.</td>
<td></td>
</tr>
<tr>
<td><strong>RSSL STATUS CODE</strong></td>
<td><strong>SSL STATUS CODE</strong></td>
</tr>
<tr>
<td>-----------------------------</td>
<td>----------------------------------</td>
</tr>
<tr>
<td>RSSL_SC_NONE</td>
<td>SSL_INFO_NONE</td>
</tr>
<tr>
<td>RSSL_SC_NOT_FOUND</td>
<td>SSL_INFO_NONE</td>
</tr>
<tr>
<td>RSSL_SC_TIMEOUT</td>
<td>SSL_INFO_NONE</td>
</tr>
<tr>
<td>RSSL_SC_NOT_ENTITLED</td>
<td>SSL_INFO_NO_PERMISSION</td>
</tr>
<tr>
<td>RSSL_SC_INVALID_ARGUMENT</td>
<td>SSL_INFO_NONE</td>
</tr>
<tr>
<td>RSSL_SC_USAGE_ERROR</td>
<td>SSL_INFO_NONE</td>
</tr>
<tr>
<td>RSSL_SC_PREEMPTED</td>
<td>SSL_INFO_PREEMPTED</td>
</tr>
<tr>
<td>RSSL_SC_JIT_CONFLATION_STARTED</td>
<td>SSL_INFO_NONE</td>
</tr>
<tr>
<td>RSSL_SC_REALTIME_RESUMED</td>
<td>SSL_INFO_NONE</td>
</tr>
<tr>
<td>RSSL_SC_FAILOVER_STARTED</td>
<td>SSL_INFO_FAILOVER_START</td>
</tr>
<tr>
<td>RSSL_SC_FAILOVER_COMPLETED</td>
<td>SSL_INFO_FAILOVER_COMPLETE</td>
</tr>
<tr>
<td>RSSL_SC_GAP_DETECTED:</td>
<td>SSL_INFO_NONE</td>
</tr>
<tr>
<td>RSSL_SC_NO_RESOURCES</td>
<td>SSL_INFO_NO_RESOURCES</td>
</tr>
<tr>
<td>RSSL_SC_TOO_MANY_ITEMS</td>
<td>SSL_INFO_TOO_MANY_ITEMS</td>
</tr>
<tr>
<td>RSSL_SC_ALREADY_OPEN</td>
<td>SSL_INFO_NONE</td>
</tr>
<tr>
<td>RSSL_SC_SOURCE_UNKNOWN</td>
<td>SSL_INFO_SRC_UNKNOWN</td>
</tr>
<tr>
<td>RSSL_SC_NOT_OPEN</td>
<td>SSL_INFO_NOT_OPEN</td>
</tr>
<tr>
<td>RSSL_SC_NON_UPDATING_ITEM</td>
<td>SSL_INFO_NON_UPDATING_ITEM</td>
</tr>
</tbody>
</table>

*Note:* The following SSL Status Codes are SSL constants. Do not rename them.

Table 7: Mapping Table for RSSL Status Code to SSL

<table>
<thead>
<tr>
<th><strong>RSSL DATA STATE</strong></th>
<th><strong>SSL DATA STATE</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>RSSL_DATA_NO_CHANGE</td>
<td>SSL_S_NO_CHANGE</td>
</tr>
<tr>
<td>RSSL_DATA_OK</td>
<td>SSL_S_OK</td>
</tr>
<tr>
<td>RSSL_DATA_STALE</td>
<td>SSL_S_STALE</td>
</tr>
</tbody>
</table>

Table 8: Mapping Table for RSSL Data State to SSL
6.2 Dictionary Download

When Reuters SSL client connections are enabled via the `enableSslServer` parameter, EZD loads data dictionaries to support RWF to Marketfeed conversion. EZD reads the `enum` file from the location provided via the following parameter:

*ezd*enumFile : ` ENUMtype.def`

If EZD cannot find a valid `enum` file to load, it disables SSL connections.

By default, EZD attempts to download RDMFieldDictionary from upstream. Reuters SSL client connections are disabled until the dictionary is successfully loaded. The `dictDownloadTimeout` (Default is 60 seconds) parameter determines how long EZD waits to download the dictionary. If EZD cannot download the dictionary within that time, then EZD attempts to load the dictionary from the file specified by the configuration parameter `fieldDictionary`. If EZD is unable to load the dictionary via download or from the file, then it logs failure to download dictionary and disables SSL client connections.

If both RSSL and SSL connections are enabled for EZD, failure to download the dictionary or read it from the file disables only SSL connections; EZD continues to accept RSSL connections.

6.3 Parameters for EZD SSL

The following parameters support the SSL connections:

*ezd*enableSslServer : True  
*ezd*snkSslServer*sslPort : 8101  
*ezd*snkSslServer*guaranteedOutputBuffers : 200  
*ezd*snkSslServer*maxOutputBuffers : 400  
*ezd*snkSslServer*numInputBuffers : 10  
*ezd*pingInterval : 20  
*ezd*pingKillInterval : 60  
*ezd*snkSslServer*reservedFileDescriptors : 64  
*ezd*snkSslServer*allowCompMode : True  
*ezd*snkSslServer*tcpRecvBufSize : 524288  
*ezd*snkSslServer*tcpSendBufSize : 524288  
!*ezd*snkSslServer*compressionType : 1  
!*ezd*snkSslServer*zlibCompressionLevel : 5
Chapter 7  EZD Failback

7.1  Overview

The failback feature allows a channel connected to a providing source to determine if the channel is connected to the primary host of the providing service. In some cases, the connected host may be a backup or secondary source providing data.

In EZD, the EZD seeks a northbound connection to the Elektron HMDS via the *ezd*secureConnection*hostList parameter. The EZD attempts a single connection to the first host in the list and then successively to each host thereafter when failures to the respective hosts have occurred. The hosts at the end of the *ezd*secureConnection*hostList may reference hosts that are distant for the application. In version 1.0, if the northbound channel is connected to a distant host, the EZD process must be restarted in order to have all clients attempt their connections to the desired near host. The failback feature is an automated way to move clients to a desired host.

7.2  Operation

The EZD Failback feature operates via a timer or through manual intervention. The EZD also includes configurable variables to test the failback of all connections or individual connections.

The failback timer operates similarly to a cron timer. The timer is set to expire at a certain time of the day, either once a day or on a certain day of the week. The timer expiration settings are configurable, but the timer cannot be turned off. The timer settings expire at a planned maintenance window interval. The timer settings are based on GMT time.

The second method of failback operation is via manual intervention.

The failback feature logs messages regarding connection attempts, successes, and failures. If the channel is connected to the primary host, a failback test connection is not attempted. If the channel is not connected to the primary host, a failback test connection occurs. If the failback test connection succeeds, the original connection and the client connection to the EZD are terminated. The client re-attempts a connection to the EZD to get a connection to the primary host. The client connection must be terminated in order to open streaming items to the new connection.

7.3  Configuration

Add the list of hosts to that connect to EZD to the *ezd*secureConnection*hostList parameter. The first host in the list specifies the primary host connection and is used as the primary host for the failback feature. If the connection to the primary host fails, EZD attempts connections to the subsequent hosts in the list until a connection is successful.
7.3.1 Variables for Timer Operation

To support Failback, add the Failback configuration variables listed in Table 9.

<table>
<thead>
<tr>
<th>PARAMETER</th>
<th>VALUE TYPE</th>
<th>DEFINITION</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>ezd</em>enableFailbackMgr</td>
<td>Boolean</td>
<td>Enables the Failback timing and manual intervention feature. If false, the timer does not execute and the user is unable to manually perform failback operations.</td>
</tr>
<tr>
<td><em>ezd</em>failbackTime</td>
<td>Number</td>
<td>Sets the timer to the desired hour and minute for expiration. The allowable times are 0 - 23 for the hour and 0 - 59 for the minute. Times are specified in GMT. The default setting is 00:00.</td>
</tr>
<tr>
<td><em>ezd</em>failbackDayOfTheWeek</td>
<td>Number</td>
<td>Sets the day of the week on which the failback timer expires. Allowable values are 0 - 8, where: 0 - 6 = Sunday through Saturday (respectively), 7 = Sunday (to match cron), 8 = everyday. The default setting is 0.</td>
</tr>
<tr>
<td><em>ezd</em>failbackChannelUptime</td>
<td>Number</td>
<td>Sets how long (in seconds) the test failback channel connection remains connected. The uptime indicates connection health, especially in cases where the connection could be intermittent. The test connection cannot exceed 60 seconds because a login message is not sent to the upstream source. The upstream source removes connections after 60 seconds if a login message is not sent. The default setting is 45.</td>
</tr>
<tr>
<td><em>ezd</em>failbackChannelTimeout:</td>
<td>Number</td>
<td>Sets how much time the EZD spends trying to connect to the primary host. If the specified time expires, the failback test connection fails. The default setting is 45.</td>
</tr>
</tbody>
</table>

Table 9: Failback Timer Parameters

7.3.2 Manual Operation

Initiate manual failback by changing the following parameters in ezdmon (ManagedProcess.ezd object):

▶ Test failback ability for all channels by entering the following command:

Change the following parameter in the HTTPSrcChannel object in the mob.

```
FailbackAllToPrimaryHosts
```
Test failback ability for a single connection by entering the following command:

Change the following parameter in the HTTPSrcChannel object in the mob.

FailbackToPrimaryHost

The HTTPSrcChannel Stats screen contains new variables that show:

- The primary host name
- A true/false indicator to indicate if the connection is connected to the primary host
Chapter 8  Logging and Monitoring

The EZD application maintains a log file (ezd.log) regarding application events such as login attempts and user disconnects. It also publishes statistics into shared memory. You can use the ezdmon monitoring tool to look into the shared memory segment. To connect to the shared memory segment, you must provide ezdmon the path to the configuration file. By default, the EZD monitor opens in the managed object browser (mob) mode.

**Note:** When specifying the configuration file using MS Windows, be sure to use the forward slash (/) as the directory separator as opposed to the backslash (\).

```
ezdmon -c ezd.cnf
```
Chapter 9  Endpoint Site Maintenance

Sites that host EZD connections undergo periodic maintenance that may affect EZD connectivity. The following maintenance schedule is posted for reference. EZD does not provide an alert for external site maintenance activity. If EZD connections are affected, EZD attempts to reconnect through failback.

9.1 Regional Low Usage (RLU)

Maintenance in RLU is considered low risk and should not impact service. Maintenance windows occur daily from 22:00 to 02:00 local time per region.

9.2 Global Low Usage (GLU)

Maintenance in GLU carries higher risk and may be service impacting. EZD may not be able to connect to preferred sites during these times. The following maintenance windows are used during GLUs:

- GLU1: Friday 23:00 GMT > 07:00 GMT Saturday
- GLU2: Saturday 14:00 GMT > 02:00 GMT Sunday
Appendix A  Troubleshooting

Problems with EZD are typically broken down into two areas:

- Initial connection of EZD to the internet. The initial connection includes complexity due to the following requirements:
  - Specify the internet proxy
  - Configure the ILAs
  - Complete the SSL handshake

- Maintaining EZD connection to the internet. Problems maintaining the connection to the internet are typically related to the quality of the ISP. Details are provided for determining the reliability and bandwidth required for the link.

A.1  Startup Issues: Windows Shared Memory

EZD must run in a command window with administrative privileges in order to attach to shared memory. Verify that your command window has administrative privileges.

A.2  Problems with Initial Connection to the Internet

A.2.1  Proxy Configuration

Most user sites do not have direct access to the internet. In this case, an internet proxy is used for connectivity. The internet proxy is configured via the `proxyHost` and `proxyPort` configuration parameters.

It is important to note that EZD does not support loading or parsing of a proxy `.pac` file, which details the proxies than can be used based on the client’s region/domain/etc. Instead, the proxy must be specified directly. If a client configures `proxyHost` to be a web server that contains the proxy `.pac`, the following is logged:

```plaintext
<ezd.1.ezd: Error: Tue Aug 19 14:39:38.630202 2014>
Channel initialization failed for socket 10 to host emea1.streaming-ec.cp.thomsonreuters.com
   error code -1. Text: <Impl/ripcsrvr.c:5949> Error: 1002 Could not read Proxy HTTP Ack
   received. System errno: (11)
Text: HTTP/1.1 400 Bad Request
Content-Type: text/html; charset=us-ascii
Server: Microsoft-HTTPAPI/2.0
Date: Tue, 19 Aug 2014 14:44:48 GMT
Connection: close
Content-Length: 324

<!DOCTYPE HTML PUBLIC "-//W3C//DTD HTML 4.01//EN" "http://www.w3.org/TR/html4/strict.dtd">
<html>
<head>
<title>Bad Request</title>
<meta http-equiv="Content-Type" content="text/html; charset=us-ascii"></head>
<body>
<h2>Bad Request - Invalid URL</h2>
<hr>
<p>HTTP Error 400. The request URL is invalid.</p>
</body>
</html>
```
Test a proxy by configuring a web browser with a proxy. In Internet Explorer, click **Tools > Internet Options > Connections > LAN Settings**. Click the Proxy server box and enter the hostname and port of the proxy. If the web browser connects to the internet, these same settings should work to connect the EZD to the internet with the internet proxy.

### A.2.2 Hostname Lookup

If the EZD is unable to resolve the hostname in the **hostList** file, the following is logged:

```
Failed to connect secure Channel to host hostname. Error:<Impl/ripcsrvr.c:xx>
Error: xx ripcHostByName() failed.
Hostname is incorrect. System errno: (24).
```

Typically, this denotes a typographical error in the **hostList**. However, it also occurs if the internet connection is down; in which case, access to DNS is lost. As long as a simple ping works to reach the hostname, then this error log should not be present.

### A.2.3 Connection Timeouts

Connection timeouts are the most common scenario for connection problems. The EZD includes a timeout parameter. If there is no response after 25 seconds, then the EZD connection to the specified host did not complete. This could be due to intermittent Internet connectivity, excessive delay when reaching the host, or other possibilities. If other hosts are specified in the hostlist, successive host connections are attempted.. When a connection timeout occurs, the following is logged:

```
Socket # trying other hosts due to host connection timeout for host hostname.
```

Generally, a ping to the proxy or server host is the next step to reestablish basic connectivity. If an internet connection is detected, then verify the port settings for both the proxy and the server host. In most cases, server host is port 443 and the proxy is either 8080 or 8081.

### A.2.4 Downstream Disconnects

Downstream application disconnects generate the following text:

```
Disconnecting client 8 from source hostname. Removing secure channel socket #.
Reason : client disconnect; text from client: rsslRead failed with code -1 and system error 0. Text: <Impl/ripcsrvr:xxxxx> Error : 1002 ripcRead() failure.
Connection reset by peer.
```

Downstream disconnects may occur for normal reasons such as component restart, bandwidth exhaustion, or network outage. In some cases, the EZD upstream connection timeout is longer than the downstream connection timeout. In this case, the above text is logged as client disconnected and reconnected later. More specifically for the ADH, the default disconnect timeout is 10 seconds. If EZD cannot connect upstream, the ADH times out the login request and reconnects 10 seconds later. In this case, Thomson Reuters recommends that you configure the ADH **requestTimeout** parameter to 30 seconds.
A.2.5 Misconfigured UserName

All users that connect to EZD must specify a mapping from user name to ILA. This is controlled with the user_list.txt file. For some applications, the user name is not configurable, and the EZD modifies the user name in order to get the correct permissions for access.

If a user attempts to connect and does not have a user to ILA mapping in the user_list.txt file, the user name is not remapped and is denied a login. Alternatively, if the user name is remapped to an ILA properly but the ILA is wrong or no longer valid, the user cannot login. In either case, the following login status message is displayed in the ezd.log:


The login denied message is not displayed by the EZD. Instead, the following message is printed to adh.log or the application log file:

Session disconnected (route "adh2_rdf", host "ezd2", port 14002). Login request for user ""#219687"" has been denied. Text:
DACS Gateway connection is down
Connection request will be sent periodically.
Message will be logged when channel login succeeds.

EZD detects the following login issues and prints the associated status message to the ezd.log:

- Improper ILA:

The EZD process has intercepted a login response failure to the client from host amers1.streaming-ec.cp.thomsonreuters.com on socket 10. Reason from source:User reuters does not have an ILA value in the user file.
</END>

- ILA not in license:

The EZD process has intercepted a login response failure to the client from host amers1.streaming-ec.cp.thomsonreuters.com on socket 10. Reason from source:User root ILA value does not exist in the product license. User root ILA value #226B70 does not match the license values of #22C004,#22C02A,#22C002
</END>
The **DACS Gateway connection is down** text is not very informative, but it does note that the user’s credentials were incorrect. Verify credential configuration is correct by ensuring that the ILA in the `user_list.txt` file is correct. If access to ERT through other means, such as TAM or Professional Services, run `rmdstestclient` with the ILA as the item name. If it comes back with a closed status, then the ILA string is bad or has expired. If it comes back with an image, then the ILA is fine.

**Note:** ILA rics always start with a # and typically are numbers and capital letters.

At this point, verifying the user name specified in the login is necessary. The user name is configured in the `userName` parameter in the ADH configuration. The username should be an actual user name and not an ILA within the ADH. The name must be present in the `user_list.txt` along with the proper ILA. To ensure EZD reads this file correctly, verify the `RegisteredUserDatabase` with mob. The bottom of the mob screen displays all user names. View the ILA that the user is mapped to by selecting the user name.

If you are still unable to login with the user name, connect to EZD with `rmdstestclient` using the ADH or application user name along with the `-l stdout` option and save the results to a file. Send the file to Thomson Reuters support for further analysis.

### A.2.6 Solaris Operation with Installed OpenSSL libraries

Thomson Reuters recommends that all Solaris users upgrade to the latest version of the OpenSSL libraries to get the latest security enhancements. However, some customers may not be able to install the latest version of the libraries.

By default, Solaris 10 installations have OpenSSL 0.9.7, and Solaris 11 installations have OpenSSL 1.0.1. These libraries may be used to connect EZD to the Thomson Reuters endpoints. Enable a different version of the OpenSSL libraries by performing the following steps:

**Note:** Only 64 bit libraries are supported.

1. Modify the configuration file to enable different library versions.

   ```
   *ezd*libNameCrypto : libcrypto.so.0.9.7
   *ezd*libNameOpenSSL : libssl.so.0.9.7
   ```

2. Configure `LD_LIBRARY_PATH` to the location of the 64 bit libraries. For example: `usr/sfw/lib/64`. 
A.3 Content Issues

Content received from EZD is identical to what is received from EED Full Tick and EED Optimized. For clients that are migrating from RDF to EZD, the content difference that they experience from the EED is the same for EZD. For example, on RDF, most text strings are space padded, while on ERT, the text strings are not.

However, there may be a handful of indirect differences.

A.3.1 Lack of Content Due to Region

Some small subsets of content are only available in EMEA, AMERS, and APAC. As such, failover from APAC to EMEA, for example, could result in content being unavailable despite the fact the user has the required permissions for that content. The only workaround is to failback to the primary data center as soon as it is available.

Permission failures take the form of status closed responses with the info code and status text of PERMISSION_DENIED.

A.3.2 Eikon Quote Lists Missing fields

Eikon relies on consolidated fields (such as fields in dictionary that start with CF_) to populate the quote list. These fields are generated in one of the following ways:

- By the RDF when consolidated field mapping logic is enabled (The default is disabled). EED does not have this logic
- Within HMDS by a component called the field mapping server, but only for hosted Eikon
- Within the Eikon desktop itself in the event the previous two are not available

The first two methods come at a CPU and bandwidth premium for all downstream devices and are not the desired direction. The third method works, but only if the service is configured as the IDN feed. Refer to Figure 1.

![Figure 1. IDN Feed Configuration](image)

For clients that have RDF and Eikon, the expectation is that they have IDN_RDF as their IDN or Elektron Feed and add a new feed for Elektron Zero Daemon to compare the two. This does not work for quote lists, because Eikon can have only a single IDN or Elektron feed.
A.4 Internet Connectivity Issues – Client/EZD Disconnects

After the connection is established, the most common problem a client experiences is a disconnect due to internet issues or high latencies for data.

EZD disconnects from the internet are reported as `rsslRead` or `rsslWrite` failures in the `ezd.log` file. Channel disconnects are detected by the OS when writing or reading to a socket fails.

**Note:** The EZD maintains a one-to-one mapping between client channels and upstream channels. If the upstream channel is lost, it causes the downstream client connection to disconnect.

Internet disconnects can occur even if the internet link appears healthy. However, because this is TCP/IP, sudden, heavy latency spikes, heavy packet loss, or exceeding bandwidth at an instant in time where bandwidth is shared with other clients can result in the upstream ADS cutting the channel to avoid unmarked stale data. EZD connects to ADS with traffic management enabled such that just in time conflation takes place during periods of sudden congestion. However, just in time conflation is trade-safe, so trade spikes alone can cause channel disconnects.

From the client side, [www.speedtest.net](http://www.speedtest.net) may be used to determine the ping and bandwidth characteristics of the internet connection. Contact a Thomson Reuters representative for bandwidth requirements per watchlist size.

Loss is determined by measuring duplicate or selective ACKS reported by the OS. The greater the number of duplicate or selective ACKS, the greater the likelihood that TCP cannot recover and results in a channel cut.

The `netstat -s -f tcp` command on Linux and Solaris platforms may be used to determine the number of selective or duplicate ACKS reported by the OS.
Appendix B  FAQs

1. How do I check Watchlist for each user in EZD?
   
   There is no watchlist in the EZD, because it is a proxy with no knowledge of what users request. Anything that is opened on
   the EZD is immediately passed upstream.

2. Why is there no IPC session in shared memory for my connection?
   
   If the application connects to EZD, but EZD is unable to connect to the ADS or proxy upstream, the downstream connection
   is disconnected. The event is logged within EZD, and the application is disconnected. EZD attempts to reconnect to the
   application.

   When a connection is established on both ends, there are two IPC sessions in shared memory:
   
   • The RIPCClient object that represents the connection from EZD to application (such as ADH). This contains the IP
     address of the connected application.
   
   • The HTTPSrcChannel object that represents the connection from EZD to upstream ADS.

   All shared memory statistics may be viewed in `ezdmon -mob`.

3. What services does EZD provide?
   
   The only service name that EZD provides is `ELEKTRON_DD`. However, this may change as EZD evolves. `ELEKTRON_DD`
   represents a 330ms trade-safe conflated service. The actual service on the headend is `IDN_RDF`, but the default
   configuration remaps this service name to `ELEKTRON_DD`.

4. Why do I have to remap the user name to ILA in the user_list.txt file?
   
   This logic is provided for applications that do not make user names configurable. The user name that is logged into the
   upstream ADS is a valid ILA with the permission profile for that user for that ILA. In order to leverage the ILA for permissions,
   the remapping is performed by the EZD. This is similar to how EED and RDF remap user names to ILAs for permissions.

5. Where do I get the EZD license file?
   
   Refer to Section 2.5.8 for details on obtaining an EZD license. Contact Thomson Reuters for setting up a new ILA.
6. Why did my application get disconnected from EZD after it successfully connected?

The most likely scenario is a problem with the internet connection. When the internet connection is lost, the EZD disconnects the downstream user as well. The EZD might also disconnect the downstream user if the application is slow reading or the LAN connection is bad.

Contact the ISP to verify the health of the internet connection and ensure adequate bandwidth is available. A disconnect on market open or market close is typically indicative of bandwidth problems either within the internet or on the client site. Bandwidth through a corporate internet proxy is also known to have limits lower than what the internet connection might provide.

The most common indication of outright network connectivity problems is if on reconnection, the EZD prints the following error:

```
Failed to connect secure Channel to host hostname. Error:<Impl/ripcsrvr.c:xx>
Error: xx ripcHostByName() failed. Hostname is incorrect. System errno: (24).
```

This log message is a direct result of EZD calling `gethostbyname` for the hosts in `hostList`. If EZD is unable to obtain the IP address of the host after it was able to resolve on startup, then EZD cannot access the internet DNS, which is most likely due to loss of internet connection.
Appendix C  Configuration File

!  !Elektron Zero Daemon (EZD) Sample configuration file  
!

!!  Shared memory configuration
!!
*maxSemaphores : 6
*admin*maxClients : 10
*ezd*admin*semaphoreKey : 90
*ezd*admin*sharedMemoryKey : 90
*ezd*admin*sharedMemorySize : 1000000
*ezd*admin*enableChildStats : False
*ezd*admin*enableRootStats : True
*ezd*admin*enableMemoryStats : True

!!  Logging information
!!
*ezd*logger*file : ./ezd.log
*ezd*logger*install_file_action : True
*ezd*logger*install_stderr_action : False
*ezd*logger*install_system_action : False
*ezd*logger*logDtMsgTogether : False
*ezd*logger*max_bytes : 3000000
*ezd*logger*max_swapfiles : 0
*ezd*logger*microSecTimeStamps : true
*ezd*logger*selector : *.debug
*ezd*logger*timeStampFormat : %a %b %d %H:%M:%S %Y

!!  Tracing information
!!
*ezd*debugTrace : False
*ezd*dumpIncoming : False
*ezd*dumpOutgoing : False
!! EZD program information
!!
*ezd*licenseFilePath : ezd_licensefile.txt
*ezd*userILAFile : user_list.txt
*ezd*bindMainThread : P:0 C:0 T:0
!*ezd*libNameCrypto :
!*ezd*libNameOpenSSL :
!!
!! Dictionary Parameters
!!
*ezd*downloadDictionary : True
*ezd*enumFile : ../../etc/enumtype.def
*ezd*fieldDictionary : ../../etc/RDMFieldDictionary

!!
!! Failback Parameters
!!
*ezd*enableFailbackMgr : True
*ezd*failbackTime : 00:00
*ezd*failbackDayOfTheWeek : 0

!!
!! Client sink connection information
!!
*ezd*enableRsslServer : True
*ezd*snkRsslServer*rsslPort : 14002
*ezd*snkRsslServer*clientToServerPings : True
*ezd*snkRsslServer*sessionStatsWindow : 1
*ezd*snkRsslServer*guaranteedOutputBuffers : 200
*ezd*snkRsslServer*fdExhaustTimer : 60
*ezd*snkRsslServer*flushInterval : 20
*ezd*snkRsslServer*maxOutputBuffers : 400
*ezd*snkRsslServer*minPingTimeout : 6
*ezd*snkRsslServer*numInputBuffers : 10
*ezd*snkRsslServer*pingTimeout : 30
*ezd*snkRsslServer*reservedFileDescriptors : 64
*ezd*snkRsslServer*rsslTrace : False
*ezd*snkRsslServer*rsslConnectionTimeout : 60
*ezd*snkRsslServer*serverToClientPings : True
*ezd*snkRsslServer*timedWrites : True
*ezd*snkRsslServer*tcpNoDelay : False
*ezd*snkRsslServer*tcpRecvBufSize : 524288
*ezd*snkRsslServer*tcpSendBufSize : 524288
*ezd*snkRsslServer*compressionType : 1
*ezd*snkRsslServer*zlibCompressionLevel : 3
*ezd*snkRsslServer*forceRsslCompression : False
!end rsslServer params
*ezd* enableSslServer : True
*ezd* snkSslServer*sslPort : 8101
*ezd* snkSslServer*guaranteedOutputBuffers : 200
*ezd* snkSslServer*maxOutputBuffers : 400
*ezd* snkSslServer*numInputBuffers : 10
*ezd* snkSslServer*pingInterval : 20
*ezd* snkSslServer*pingKillInterval : 60
*ezd* snkSslServer*reservedFileDescriptors : 64
*ezd* snkSslServer*sessionStatsWindow : 1
*ezd* snkSslServer*allowCompMode : True
*ezd* snkSslServer*tcpRecvBufSize : 524288
*ezd* snkSslServer*tcpSendBufSize : 524288
*ezd* snkSslServer*compressionType : 0
*ezd* snkSslServer*zlibCompressionLevel : 5
!end sslServer params

!begin secure connection params

!! Outbound Encrypted Internet connection information !!
*ezd* secureConnection*hostList : amers1.streaming-ec.cp.thomsonreuters.com,
    amers2.streaming-ec.cp.thomsonreuters.com
*ezd* secureConnection*port : 443
*ezd* secureConnection*proxyHostName :
*ezd* secureConnection*proxyPort :
*ezd* secureConnection*reencodeSrcDir : True
*ezd* secureConnection*IDN_RDF*clientServiceName: ELEKTRON_DD
*ezd* secureConnection*compressionType: 1
*ezd* secureConnection*guaranteedOutputBuffers : 200
*ezd* secureConnection*numInputBuffers : 10
*ezd* secureConnection*pingTimeout : 30
*ezd* secureConnection*tcpNoDelay : False
*ezd* secureConnection*tcpRecvBufSize : 2048000
*ezd* secureConnection*tcpSendBufSize : 2048000
*ezd* secureConnection*tryNextHostTime : 25
!end secure connection params
Appendix D  Sample Install Script

-------------------------------------------------------------
1: Install EZD and install Perception Agent
2: Just install EZD
3: Just install Perception Agent
What would you like to do? 1
-------------------------------------------------------------
An EZD license file is not required to install EZD but IS required to install Perception Agent.
Do you have an EZD license file? [y/n] y
-------------------------------------------------------------
Please enter the path for the license file.
License path: /local/ezd_licensefile.txt
-------------------------------------------------------------
1: Install EZD in default path at /opt/thomsonreuters/SOFTWARE/ezd1.1
2: Enter custom path
Where would you like to install EZD? 1
-------------------------------------------------------------
1: Install EZD CONFIGURATION FILE in default path at /opt/thomsonreuters/SOFTWARE/globalconfig
2: Enter custom path
Where would you like to install the configuration file? 1
-------------------------------------------------------------
Please enter a username and ILA separated by a comma
ex) user1, #11B326
User & ILA: new_user, #12B03C
-------------------------------------------------------------
Would you like to add any more users? [y/n] n
-------------------------------------------------------------
Enter the number for which region EZD will be connecting to
1: EMEA (emea1.streaming-ec.cp.thomsonreuters.com, emea2.streaming-ec.cp.thomsonreuters.com)
2: APAC (apac1.streaming-ec.cp.thomsonreuters.com, apac2.streaming-ec.cp.thomsonreuters.com)
3: AMERS (amers1.streaming-ec.cp.thomsonreuters.com, amers2.streaming-ec.cp.thomsonreuters.com)
4: Custom Host
hostList: 3
-------------------------------------------------------------
Will you be routing through a proxy? [y/n] y
-------------------------------------------------------------
Please enter the proxy host name: www.test.proxy.net
-------------------------------------------------------------
Please enter the proxy port: 8081
1: SSL  
2: RSSL  
3: SSL & RSSL  
Would would like to enable SSL, RSSL, or both? [enter 1, 2, or 3] 3

Enable failback for ezd? [y/n]  
Default is [y]  
Enable failback: y

Please set the failback day of the week. Default is [8]  
0: Sunday  
1: Monday  
2: Tuesday  
3: Wednesday  
4: Thursday  
5: Friday  
6: Saturday  
8: Everyday  
Day of the week: 8

Please enter the failback time in 24hr format. Default is 12:00AM  
NOTE: The time should be GMT  
ex) 00:00  
Failback time: 00:00

Installed in EZD in /opt/thomsonreuters/SOFTWARE/ezd1.1  
Installed EZD configuration file in /opt/thomsonreuters/SOFTWARE/globalconfig  
Installation complete!

Setup will now install perception agent.

Setup has detected that ezd_licensefile.txt is not in its default location at /opt/thomsonreuters/SOFTWARE/globalconfig/ezd_licensefile.txt  
1: Move license file to default location.  
2: Move license file to another location.  
What would you like to do: 1

Please enter the location of the EZD configuration file.  
Location: /opt/thomsonreuters/SOFTWARE/globalconfig/ezd.cnf

Please specify the path to the top level directory for EZD.  
ex) The default top level directory would be /opt/thomsonreuters/SOFTWARE/ezd1.1/  
Path: /opt/thomsonreuters/SOFTWARE/ezd1.1/  

Setup is installing Perception Agent
EZD Root: /opt/thomsonreuters/SOFTWARE/ezd1.1/
EZD Gateway: amers1.streaming-ec.cp.thomsonreuters.com, amers2.streaming-
   ec.cp.thomsonreuters.com
Licence File: /opt/thomsonreuters/SOFTWARE/globalconfig/ezd_licensefile.txt
Licence ID: 221461
Licence Version: 1.1
Licence Expiry: Jan 30 2015
Licensee: Thomson Reuters INTERNAL - Elektron Dev/QA/Support - TR010
ILA List: #12B03C
User List File: user_list.txt
Username: new_user
Proxy Host: www.test.proxy.net
Proxy Port: 8081
The Actual Experience Perception Agent has been installed and
configured to monitor EZD. You can now start the agent by running:
   sudo service perception-agent start
E.1  Installation and Configuration (RHEL6)

E.1.1  Dependencies

The agent must be installed after EZD is installed and configured.

The agent is packaged in the form of a gzip compressed tarball. This tarball contains the agent and all the software dependencies of the agent that are not available in the default RHEL6 repositories. They are pre-built and ready to be used as a Software Collection (SCL).

▶ If it is not already installed, install scl-utils by entering the following command:

```sh
cd /opt
$ tar -xf perception-agent_version.tar.gz
```

E.1.2  Unpacking

Copy the perception-agent tarball to a suitable location in the filesystem where it will not be cleaned out during a machine restart.

Example: `/opt`

**Note:** Although many like to add the verbose flag (`-v`) to un-tar commands, Thomson Reuters recommends not using this method due to the large number of files to unpack. Printing the file paths to stdout is significantly slower than uncompressing and unpacking them, especially over a network connection.

▶ Unpack the tarball by entering the following commands:

```sh
$ cd tarball_location
$ tar -xf perception-agent_version.tar.gz
```
E.1.3 Installing

The perception-agent base directory includes an install script that is used to modify environment-dependent agent modules and install the default configuration, startup scripts, and SCL scripts. The install script must be run with root privileges. Running the script with the `--help` argument displays the arguments that can be used to locate the EZD installation. If EZD is in its default location `/var/reuters/rmds`, these arguments are unnecessary.

The perception-agent requires the license file contents to be in a standard format. If the perception-agent installation fails, verify that a carriage return exists at the end of the file, and then repeat the perception-agent installation procedure.

Run the install script by entering the following commands:

```
$ cd perception-agent
$ ./install.sh --help
$ ./install.sh
```

E.1.4 Configuring

Most of the perception-agent configuration, including proxy configuration, is performed when the EZD `install.sh` script is run. If EZD is reconfigured, the `install.sh` script should be re-run. This is especially true if any proxy settings or the `*ezd*hostList` or `*ezd*userILAFile` settings are changed.

If any extra configuration is needed (for plugins), the configuration file `perception_agent_base/root/etc/perception-agent/agent.conf` can be modified. Ensure that any additions to the `agent.conf` file are made below the `### CUT ###` line so that they are not be lost if `install.sh` is used to update the configuration. The cut line must not be removed.

E.2 Running

E.2.1 Run the Agent as a Service

Once installed and configured, the simplest way to run the agent is by calling the service script.

Run the agent as a service by entering the following command:

```
$ /etc/init.d/perception-agent start
```

This script can also be used to stop, restart, and check on the status of the agent, as well as start the agent with extra command line arguments. The usage is generally:

```
$ /etc/init.d/perception-agent [start|stop|restart|status] [--log-level [debug|info|warning|error]] [--http-dump]
```
E.2.2 Agent Information

The agent can report some information about itself to the command line – version and ID number (after first-run registration). Because the agent distributed in this tarball is installed as a Software Collection, it must be run as such to retrieve this information. For example:

```bash
$ scl enable perception-agent 'agent.py -v'
# returns version string

$ scl enable perception-agent 'agent.py -a'
# returns agent ID

$ scl enable perception-agent $SHELL
# start a shell with the correct environment for running the agent
```
Appendix F  Configuration Example

Figure 2 illustrates how the EZD server is connected to an application server and the Thomson Reuters servers.

Figure 2. EZD Sample Configuration