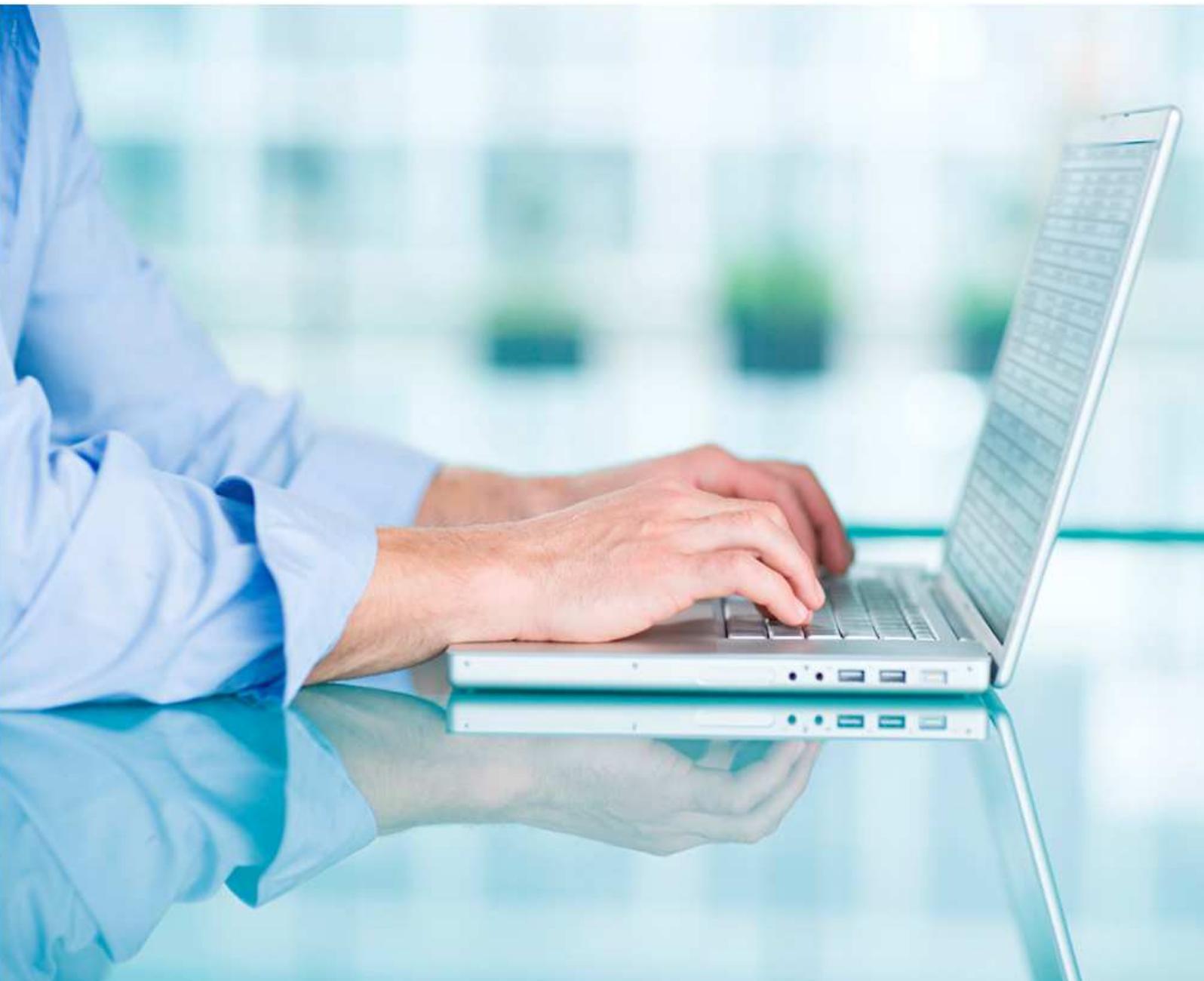


PrimeTerminal Professional Technical Guide

By: FactSet Digital Solutions/nl,ag Revision Version: 3.9 Revision Date: 2017-06-08

Company unrestricted



Revision History

Revision Release Date	Revision Version	Revision Notes	Revision Author
2017-05-30	3.9	New brand	Nadja Leppert
2017-05-30	3.9	HTTPS and POST support	Adam Goode
2017-06-06	3.9	Application tester image, connection status indicator, 3 rd party software	Adam Goode
2017-06-08	3.9	Final quality assurance	Nadja Leppert

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1 Network Infrastructure and Security

PrimeTerminal Professional (in following PrimeTerminal) can be operated in two different infrastructure scenarios:

- The hosted solution is available for any number of seats. Since it uses shared servers at Interactive Data Managed Solutions' facilities and the Internet, it is faster to set up than a leased line solution, but it is less flexible in terms of in-house data integration.
- A leased line is recommended for customers who are operating more than 50 seats of PrimeTerminal.

1.1 Hosted Solution

The hosted solution is best suited for customers who need convenient and easy to maintain access to a terminal solution but which does not require individual adaptations or custom data feeds. However, such adaptations could also be provided in a hosted solution although a hosted solution is not recommended for this.

The hosted solution uses the Internet to transmit requests and data between each PrimeTerminal installation and shared backend servers in FactSet Digital Solutions' facilities to answer requests and store customer data.

The *Basic* hosted solution uses default tick aggregation delay of 1000 ms for streaming data to ensure efficient bandwidth. The *Advisor* hosted solution does not do any tick aggregation (see 3.1 for details).

1.2 Leased Line

A leased line is recommended for customers who demand a powerful, secure installation of PrimeTerminal for 50 seats or more and who may require specific customizations on the application or proprietary data feeds. Please contact your FactSet Digital Solutions representative to discuss the options in greater detail.

2 Installing PrimeTerminal

Note: All the following URL's in the upcoming sections refer to a hosted solution.

2.1 Client System Requirements

2.1.1 Recommended Hardware

- 2 gigahertz (GHz) or faster with a 32-bit or 64-bit processor
- 2 gigabyte (GB) RAM with 512MB available
- A screen resolution of at least 1024 x 768
- 110 MB¹ available hard disk space for the Java™ JRE installation
- At least a double ISDN line with 128 Kbps (a DSL or leased line network connection is highly recommended)

Note: Systems with lower capacities may still launch PrimeTerminal but it may run slower than expected.

- Required Software
- Windows 2000, XP, Vista, Windows 7, Windows 8 or Windows 10 (Windows is a registered trademark of the Microsoft® Corporation). Other operating systems are not officially supported although they may still operate PrimeTerminal.
- A compatible web browser e.g. Internet Explorer® or Mozilla Firefox® for accessing the URL to launch PrimeTerminal.
- A 1.7 update 6 or higher Java™ JRE from Oracle. We recommend that users install the Critical Patch Update and not the Patch Set Update <http://www.oracle.com/technetwork/java/javase/cpu-psu-explained-2331472.html>

¹ This is subject to change. For the exact hard disk requirements of the needed space for the JRE installation, please refer to <http://www.java.com/en/download/help/sysreq.xml>

2.2 Further Requirements

2.2.1 General

- Access to URL <http://terminal.mdgms.com/slider/slider2.jnlp>
- Operating PrimeTerminal requires local saving of the necessary JAR files within Java Web Start cache.

2.2.2 Firewall, Proxy Server, Web Filter & other Network Components

- Access granted for terminal.mdgms.com on port 80 and 443 (Application Download, Pull and Push server access) for GET and POST requests.
- Access granted for ssl.mdgms.com port 443 (Authentication server access)
- Access granted for www.mdgtools.mdgms.com port 80 and 443 (Web server for sending error reports)
- User is allowed authentication
- No blocking of JNLP or JAR files
- No blocking of User-Agent: JNLP/1.x javaws/1.x.x_xx (xxx) J2SE/1.x.x_xx (from Java Web Start)
- No blocking of User-Agent: Java/1.x.x_xx (from the FactSet Digital Solutions Java API)
- Granted open HTTP 1.0 connections with unknown response size (no content-length header) and unlimited response time
- POST requests should not be limited in size for all hosts already listed above
- The hosts above are required to be excluded from the lists of hosts scanned by a Web Content Filter as for example Webwasher®, Blue Coat or Finjan Vital Security™.
- If any other network component manipulates HTTP traffic (e.g. introducing HTTP chunked transfer encoding) then all hosts above should be excluded from these.

2.2.3 Java Web Start (JWS) Settings

- If a different Proxy Server is required than default, this needs to be configured in Java Web Start via: Java Control Panel – “General” tab – Network Settings – Advanced².

2.2.4 Microsoft® Office Excel for DDE

- Minimum Microsoft® Office Excel version is Office 98, maximum version Office 2016.
- PrimeTerminal and Microsoft® Office Excel should be running on the same machine.

² The exact names and sequence may differ on different operating platforms and Java™ versions.

3 Components of PrimeTerminal Professional

PrimeTerminal consists primarily of the following components:

- A JNLP (Java Network Launching Protocol) file to launch PrimeTerminal. This file can be accessed using the web browser and contains a reference to the JAR files which PrimeTerminal requires to operate.
- Several JAR (Java Archive) files one of which is the executable for PrimeTerminal i.e. the application 'binary'. Other necessary JAR files are needed for execution e.g. DDE and the MDG JavaAPI.

3.1 Network Connections, Ports and Traffic

PrimeTerminal requires three separate network connections to operate:

- 1 connection for streaming data
- 1 connection for data requests and functions
- 1 connection for user authentication

On average, PrimeTerminal requires the following bandwidth (depending on the displayed data):

	for regular operations	in peak times
PrimeTerminal Advisor	20 – 100 Kbit per second	300 Kbit per second
PrimeTerminal Basic	20 – 80 Kbit per second	100 Kbit per second

Because different network configurations allow different kinds of network connections, PrimeTerminal's implementation has been configured to cover the most common configurations.

3.1.1 PrimeTerminal's Connections

- A connection to <http://terminal.mdgms.com> (80) initially loads PrimeTerminal via Java Web Start.
- A connection to <https://ssl.mdgms.com> (443) handles user authentication over SSL.
- A connection to <https://terminal.mdgms.com> port (443) handles PrimeTerminal requests such as loading of user screens and saved preferences.
- A persistent HTTP 1.0 connection to <https://terminal.mdgms.com> port (443) (without response size) provides the streaming data as requested by the application.

- An error report function allows notifying Interactive Data Manages Solutions directly in case of application malfunctions. Use of this function requires the network's ability to send HTTP POST requests to <http://www.mdgtools.mdgms.com> (80).

By default, PrimeTerminal Basic Solution does tick aggregation for streaming data in intervals of 1000 ms to allow more efficient traffic transmission.

3.1.2 Connection Status Indicator

The indicator in the upper-right corner of the PrimeTerminal (see below) displays the current connection status with FactSet Digital Solutions' data servers.

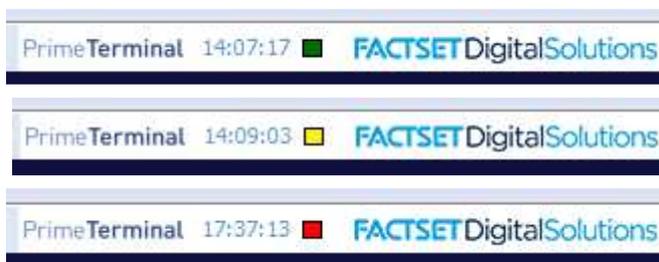


Figure 1 - Connection Status Indicator

- Green: Connection with server established
- Yellow: Connection with server lost, trying to re-establish a connection
- Red: Connection with server lost (see below for more details)

The connection status indicator will appear red when the user session is not valid anymore e.g. when an additional instance of PrimeTerminal is opened or when the session expiry time was reached (normally 24hrs).

- In addition to the connection status indicator, the word "poll" may be displayed next to the indicator in the case where a "polling" connection was established to the MDG server(s) instead of a "push" connection.

This is not the optimal operating mode for PrimeTerminal. In this case the data is not being "pushed" to the terminal. Instead the data is being "polled" on a regular interval (default is 1000ms). If poll mode is encountered it is advisable to refer back to 2.2.2 for closer inspection.

3.1.3 PrimeTerminal's Application Tester

If any issues are encountered during installation and execution of PrimeTerminal it is advisable to run the Application Tester to verify all environment requirements have been satisfied. The link for this is:

<http://terminal.mdgms.com/apptester/ptpro.jnlp>

3.2 Installing the Java Runtime Environment (JRE)

3.2.1 Installing under Microsoft® Windows 2000, XP, Vista and Windows 7, Windows 8 and Windows 10

PrimeTerminal requires a Java Runtime Environment (JRE) of the Java 2 Platform Standard Edition (J2SE) 1.7 Update 6+ from Oracle®. It is recommended to always install the latest update of the JRE.

The latest JRE can be downloaded directly from:

<http://www.java.com/en/download/index.jsp>

Older, archived versions can be downloaded directly from (however it is recommended to always download the latest version from the previous link given above):

<http://www.oracle.com/technetwork/java/archive-139210.html>

For more information on the installation please refer to:

http://www.java.com/en/download/help/download_options.xml

4 Troubleshooting

4.1 PrimeTerminal Won't Launch

4.1.1 PrimeTerminal never ran previously on the machine

Symptom Loading of the application stops with a Java™ error message

Diagnosis PrimeTerminal requires the latest Oracle® JRE (see chapter 0 for more details). Versions <=1.7 Update 6 are no longer supported by PrimeTerminal and some updates may cause problems on launch.

Repair Install (requires administration rights on the PC) the JRE as described in chapter 0 and double check the system requirements for the machine. Delete the Java cache after the installation via the Java Control Panel – tab General – Temporary Internet Files – Settings.

Symptom Downloading of the application file(s) hangs

Diagnosis The download of the application was ended prematurely caused by a timeout. The reason is most likely an internet connection which is too slow.

Repair Make sure the bandwidth and latency match the requirements specified in chapters 2.1 and 0.

Symptom “Login Network Error” message appears

Diagnosis This problem could be caused due to incompatibility of some HTTP traffic with certain proxy servers.

Repair Exclude the hosts mentioned above from the Proxy Server (see 2.2.3). If this solution is not reasonable please contact your FactSet Digital Solutions representative for further analysis and problem solving.

4.1.2 PrimeTerminal ran previously on the machine

Symptom PrimeTerminal used to work (1)

Diagnosis The system configuration has possibly been modified in terms of e.g. operating system, browser or JRE.

Repair Delete the Java cache via the Java Control Panel. If PrimeTerminal still does not launch, check which changes were done since the latest successful start of PrimeTerminal within the operating system (including Service Packs), browser (including Runtime Environments), Java Virtual Machine and network environment. Reinstall the JRE as described in 0. If required and possible, perform the installation on a 'clean' system without the latest change(s). After re-installing the JRE delete the Java cache once again.

Symptom PrimeTerminal used to work (2)

Diagnosis A Java Web Start "Unable to launch" error appears with an "HTTP 400 error" in the detailed part.

Repair Delete your Java cache via the Java Control Panel

Symptom Launching of PrimeTerminal via double click on a previously working desktop icon terminates with the message "Invalid Argument Error" (in the details of the error "Could not load file / URL specified: ..." is reported) (1)

Diagnosis The JNLP file used to launch PrimeTerminal was stored in a temporary directory, which has now been deleted by the system after a certain period.

Repair Delete the desktop icon and launch the application again via the browser URL (see 2.2.1) and then make sure that temporary internet files (tab "General" in the Java Control Panel) are permanently stored under the standard user's "Documents and Settings"³ location.

Symptom Launching of PrimeTerminal via double click on a previously working desktop icon terminates with the message "Invalid Argument Error" (in the details of the error "Could not load file / URL specified: ..." is reported) (2)

Diagnosis The JRE has been upgraded to version 6 Update 12 or 13. The Desktop icon does not work properly with these versions.

Repair As a workaround, you can launch the application via the browser URL (see 2.2.1), or install a different (earlier or later) JRE version.

³ The exact path may differ upon different operating systems.

Symptom	Loading of the application via double click on a previously working desktop icon terminates with the message “Could Not Load Argument” (in the details of the error “CouldNotLoadArgumentException[..] Could not load file/URL specified: C:\Documents and Settings\...” is reported)
Diagnosis	The JRE has been upgraded to version 6 Update 18. The Desktop icon does not work properly with this version.
Repair	As a workaround, you can launch the application via the browser URL (see 2.2.1), or install a different (earlier or later) JRE version.

4.2 Connections, Speed & DDE

Symptom PrimeTerminal runs slowly

Diagnosis	There is not enough available RAM for the application on the system. PrimeTerminal can alone consume up to 256 MB of your available RAM.
Repair	Refer to chapter 2.1 for the System Requirements of PrimeTerminal. Make sure PrimeTerminal has enough available RAM to operate by not opening too many applications concurrently or by closing unused ones.

Symptom Data streaming freezes constantly and is unstable

Diagnosis	PrimeTerminal is running in “poll mode” (refer to 3.1.2), which indicates real data streaming is not possible or “pushable”. This may happen when a web filter (e.g. Webwasher® or Blue Coat) is scanning the internet traffic from PrimeTerminal and manipulating certain HTTP headers. An indication “(poll)” can be observed next to the connection status indicator on the upper right corner of PrimeTerminal. Run the Application Tester (0) to verify the connection quality.
Repair	Disable all hosts mentioned in chapter 2.2.2 in the web filter server or local installation.

Symptom Data streaming freezes constantly and is unstable (2)

Diagnosis	The internet connection does not meet the requirements regarding bandwidth or latency. This can be observed particularly at peak times and at market openings or closings.
Repair	Check the internet connection or acquire guaranteed latency and bandwidth via a PrimeTerminal Solution with a leased line.

Symptom	The Connection Status Indicator constantly switches from green to yellow
Diagnosis	One main reason for this could be a poor internet connection. Another reason could be a firewall or proxy server which is instructed to automatically close long open HTTP 1.0 connections without a response size.
Repair	In case of the poor internet connection refer to 2.1 and 0. In case of a Firewall issue, make sure all the hosts already mentioned in 2.2.2 (in particular the Push servers) open HTTP 1.0 connections.
Symptom	The Connection Status Indicator switches to red and a restart is required
Diagnosis	The session has expired (refer to 3.1.2 for more details)
Repair	Per default, a session is only valid for 24 hours. Make sure all application changes/settings are saved frequently and close the application within this time frame. If a longer session length is required please contact your FactSet Digital Solutions representative.
Symptom	DDE does not display correctly in Excel or the updates are slow
Diagnosis	Error indication in Excel or slow update.
Repair	Check the following points in PrimeTerminal's "General Settings": Settings of the "VALUE" function is set to the Excel language Check the appropriate decimal number separator Check the update interval and the calculation update rate (in Excel) Ensure "Enable DDE data export" is selected DDE is not recommended for more than 300 instruments. Contact your FactSet Digital Solutions representative for more information on the XLPort Excel plugin.
Symptom	PrimeTerminal crashes using DDE
Diagnosis	The machine is running using "CPU Hyper Threading" and the DDE interface fails in this case.
Repair	Disable Hyper Threading on the machine's local BIOS configuration.

4.3 Miscellaneous

Symptom Internal Web Clip does not display web sites correctly

Diagnosis The display of web content uses the embedded web browser available in Java 1.7 Update 6 and greater. This embedded browser is based on webkit, an open source browser engine, which supports Cascading Style Sheets (CSS), Javascript, Document Object Model (DOM) and HTML 5. Supported features of HTML 5 in the latest version include, Canvas element, SVG element and Media Playback.

It does not provide support for any web pages that require third party plugins such as Flash, Java Applets, Silverlight.

To ensure an optimal browsing experience using this clip, Interactive Data recommends that you are using the latest version of Java.

Repair Ensure latest version of Java is installed on your machine. If the problem still persist open troublesome pages in an external browser.

Symptom Internal Web Clip runs slowly or hangs.

Diagnosis There is an issue with the display of animated GIFs in the implementation of the Browser Clip (http://bugs.java.com/bugdatabase/view_bug.do?bug_id=8117172).

Repair Close the browser clip. Open affected link in an external browser.

4.4 Sending an Error Report

The error reporting functionality allows the user to send the application log files, screenshots of the problematic desktops (optional) and the required information in order to investigate the current state of PrimeTerminal. Error reports are sent to the user's local first level support or to FactSet Digital Solutions directly depending on the agreed setup and configuration.

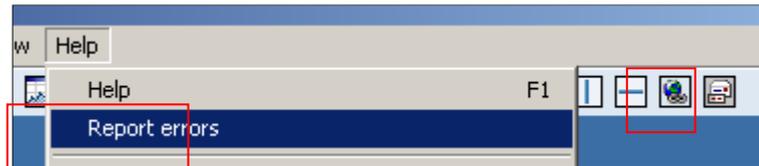


Figure 4 – Reporting Errors

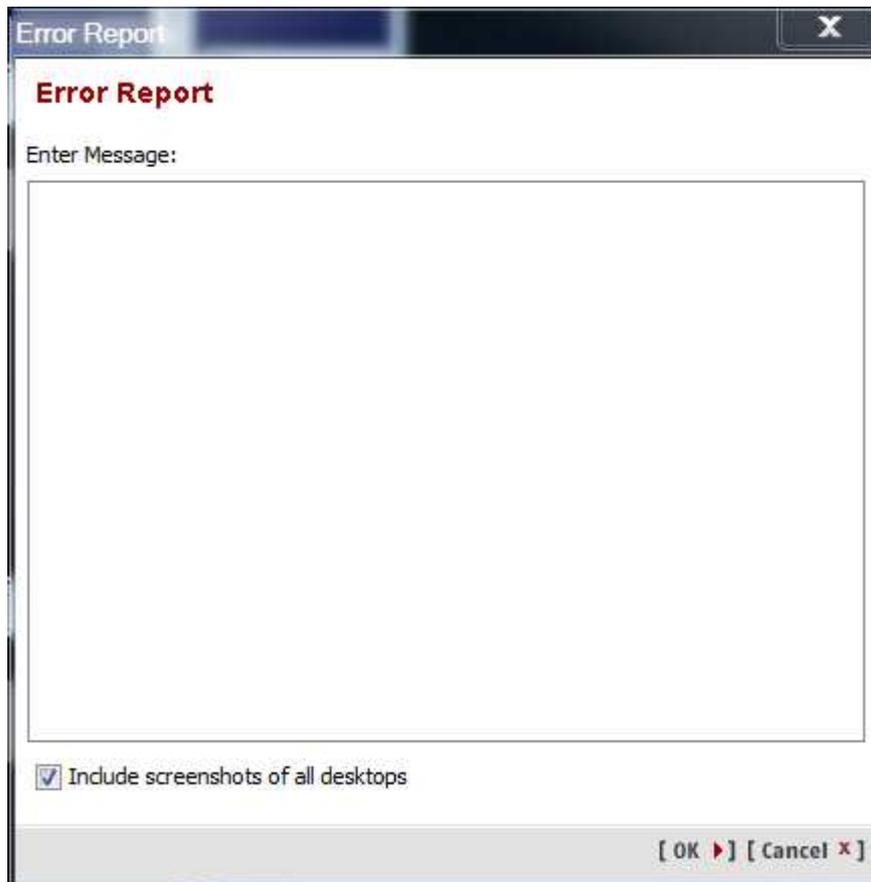


Figure 5 – Reporting Errors

5 Glossary

Abbreviation/ Term	Meaning	Further Information
SLA	Service Level Agreement	n.a.
SKYE	FactSet Digital Solutions' server(s) for pushed data	n.a.
OBAN	FactSet Digital Solutions' server(s) for non-pushed data	n.a.
JRE	Java Runtime Environment	<u>further info</u>
JNLP	Java Network Launch Protocol	<u>further info</u>
JWS	Java Web Start	<u>further info</u>

6 Third Party Software Used by PrimeTerminal

Software	Website	Version	License
JDDE	http://jdde.pretty-tools.com/	2.0.3	Apache 2.0
Commons Lang	https://commons.apache.org/proper/commons-lang/	3.3.2	Apache 2.0
Commons Codec	https://commons.apache.org/proper/commons-codec/	1.10	Apache 2.0
Jackson Databind	https://github.com/FasterXML/jackson-databind	2.5.0	Apache 2.0
Jackson Annotations	https://github.com/FasterXML/jackson-annotations	2.5.0	Apache 2.0
Jackson Core	https://github.com/FasterXML/jackson-core	2.5.0	Apache 2.0