CAPLIN

Caplin Platform 6.0

How To Use The Deployment Framework

April 2013

Contents

1 Preface

1.1 What this document contains

This document explains how to install and use the Caplin Platform Deployment Framework. It also describes how Caplin Platform blades are deployed to the Framework to create a working web trading platform.

About Caplin document formats

This document is supplied in Portable document format (*.PDF* file), which you can read on-line using a suitable PDF reader such as Adobe Reader®. The document is formatted as a printable manual; you can print it from the PDF reader.

1.2 Who should read this document

This document is intended for developers who want to create a web trading platform based on Caplin Platform components and Caplin Platform blades.

Before reading this document, you should be familiar with the concepts and terms that are introduced in the following documents:

- **Caplin Platform Overview** (all sections)
- **Caplin Platform: Deployment Framework Overview** (all sections)
- **Caplin Liberator Administration Guide** (Overview section)
- **Caplin DataSource Overview** (all sections)

1.3 Related documents

- **Caplin Platform: Overview**
  A business and technical overview of the Caplin Platform.
- **Caplin Platform: Deployment Framework Overview**
  Gives an overview of the Caplin Platform Deployment Framework, and explains the concept of Caplin Platform blades.
- **How To Create A Platform Java Blade**
  Explains in detail how to create new Java™-based Caplin Platform Blades using the Caplin Integration Suite Toolkit.
- **How To Create C And Lua Platform Blades**
  Explains in detail how to create C and Lua blades for the Caplin Platform.
- **Best Practices For Deploying The Caplin Platform**
  Provides recommendations for deploying the Caplin Platform in a typical live environment, and discusses failover scenarios for achieving high service availability.

- **Caplin DataSource: Overview**
  A technical overview of Caplin DataSource.
- **Caplin Liberator Administration Guide**
  Describes the Caplin Liberator server. Includes configuration reference information and a list of Liberator log and debug messages.
- **KeyMaster: Administration Guide**
  Describes how to set up Caplin KeyMaster and integrate it with the Liberator.
- **Caplin Platform: Monitoring and Management Overview**
  Describes the Caplin Monitoring and Management solution and its place within the Caplin Platform, and introduces the Caplin Management Console (CMC).
  DataSource For C Configuration Syntax Reference
  Describes the syntax of the language that is used to configure **DataSource applications** that have been built using Caplin's DataSource for C API. Such applications include Caplin Liberator, Caplin Transformer, and Integration Adapters that use the API.
- **StreamLink Overview**
  A technical overview of Caplin StreamLink.

1.4 Typographical conventions

The following typographical conventions are used to identify particular elements within the text.

Type	*Uses*
/AFolder/Afile.txt	File names, folders and directories
`Some code;`	Program output and script examples
The `value=10` attribute is...	Script fragment in line with normal text
Some text in a dialog box	Dialog box output
`Something typed in`	User input – things you type at the computer keyboard
Glossary term	Items that appear in the “Glossary of terms and acronyms”
XYZ Product Overview	Document name
♦	Information bullet point
■	Action bullet point – an action you should perform

Note: Important Notes are enclosed within a box like this.
Please pay particular attention to these points to ensure proper configuration and operation of the solution.

Tip: Useful information is enclosed within a box like this.
Use these points to find out where to get more help on a topic.

1.5 Feedback

Customer feedback can only improve the quality of our product documentation, and we would welcome any comments, criticisms or suggestions you may have regarding this document.

Please email your feedback to documentation@caplin.com.

1.6 Acknowledgments

2 Hardware and operating system platforms supported

The **Deployment Framework** can be used on the following hardware and operating system platforms:

- Linux® EL5 64 bit
- Windows XP® 32 and 64 bit*
- Windows 7® 32 and 64 bit*
- Apple® Mac 64 bit

* Windows implementations require Cygwin – see http://www.cygwin.com/.

3 Installing the Caplin Platform Deployment Framework

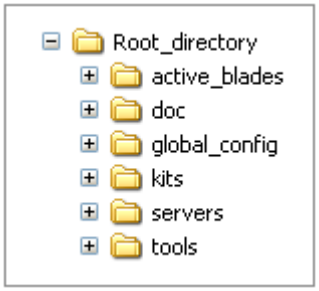
You must install the **Caplin Platform Deployment Framework** kit on all the servers that are to host the **Caplin Platform**. The kit is provided as a zip file. To install it, unzip the file in a directory of your choice, using the following command:

```
unzip –q –o –a <kit-name>
```

Note: On Windows XP and Windows 7, always install the Deployment Framework at the highest directory level possible, preferably at the root (for example, at *C:\<short_folder_name>*). Windows XP has a 260 character limit on file path names, and if the Deployment Framework is deployed at a deeper level, some files may not be created when other kits are deployed to the Framework.

4 Framework directory structure

The files and directories of the Caplin Platform Deployment Framework are organized in a well defined modular hierarchy, as shown in the following diagram:



The root directory contains the following files and directories.

Files

- *README.txt*

  A short "getting started" guide.

- *start-all.sh*

  A script that starts the system. It stops the **core components** (**Caplin Liberator** and **Caplin Transformer**) and each active **Integration Adapter**, if they are currently running, and then starts them all up.

- *stop-all.sh*

  A script that stops the system by stopping the core components and each active Integration Adapter.

- *clean-all.sh*

  A script that cleans the system logs by stopping the core components and each active Integration Adapter and then removing the log files for each of these components. This script also removes the database files containing information about the Liberator users' license usage.

- *dump-all.sh*

  A script that dumps configuration information for all the deployed binaries. The dumped information is in files in directories under *global_config/dump*. Each dumped file contains all the original configuration lines as comments, and the same lines with **configuration macros** translated to their actual values.

Note: Only run the *dump-all* script when the Deployment Framework is not in use. This is because the script stops the binaries and then runs them to read the configuration information.

- *dfw*

  A utility that consolidates all the Framework scripts; for more about this, see section 5.

active_blades directory

The Deployment Framework uses this directory to manage which blades are active.

doc directory

This directory contains documents about the Caplin Platform Deployment Framework (including this document), and the release note for the **Framework**.

global_config directory

This directory holds files and directories concerning configuration that is global to the Deployment Framework.

> **Note:** To customize the configuration, only change files that are in the *global_config* directory and its subdirectories.
> All other configuration files in the Deployment Framework and in Caplin supplied blades are read-only and must not be edited.

The *global_config/**dump*** subdirectory is used to hold configuration information created by the *dump-all.sh* script.

- *environment.conf*

  Defines **configuration macros** that are server specific, such as the port numbers of the core components and the location of the Java Runtime Environment (JRE). The default settings are defined in the included file *environment-defaults.conf*.

- *hosts-defns.conf*

  Defines the servers that core components and any **Adapter blades** run on. You must edit this file to reflect the deployment.

> **Tip:** An Integration Adapter blade consists of an executable binary file in addition to its configuration and core component configuration.

- *fields.conf*

  A file that defines the names of global fields used in **DataSource** messages.

- *licenses*

  When components are deployed, any licenses required by these components must be placed in this directory.

> **Note:** The Liberator license must be named *license-rttpd.conf*
> The Transformer license must be named *license-transformer.conf*.

- *ssl* directory

  Any SSL keys required by the system must be placed in this directory, including the public key file for **Caplin KeyMaster**.

- *overrides* directory

  This directory contains files that you can update to change configuration; for example, to make the Liberator log events at DEBUG level instead of INFO level. This is described in more detail in section 7.3 “Overriding configuration”.

kits directory

This directory initially contains the Deployment Framework’s built-in **Caplin Platform blades** and some scripts.

You use the script called *deploy.sh* to deploy core components and blade kits. The core components and all blades supplied by Caplin Systems are delivered in kit form. *deploy.sh* unpacks each kit and makes the blade components active. (For more about deploying blades and using *deploy.sh*, see section 6.3” Deploying core component and blade kits”.)

There are also some scripts for managing blades:

activate_blade.sh	Activates a blade or blades
deactivate_blade.sh	Deactivates a blade or blades
check_blades.sh	Checks the state of a blade or blades

There are two other script files in this directory:

bootstrap.sh	Used on Windows to ensure that links in the kit are created correctly.
information.sh	A utility script used by the built-in blades.

servers directory

This directory holds a number of configuration files that contain server specific configuration for the core components, such as port numbers and the location of the Java Runtime Environment (JRE).

tools directory

This directory contains some Cygwin utilities that are used by the Deployment Framework scripts.

5 The Deployment Framework command utility (dfw)

The deployment framework includes scripts for a variety of operations. These scripts are listed in section 4 “Framework directory structure”, and subsequent sections of this document explain when and how to use them. There is also a utility called *dfw* that consolidates all the scripts; you can perform any Framework operation by running the *dfw* utility with the appropriate command parameter.

- To get a list of all the possible Framework commands, type:

  ```
  ./dfw help
  ```

- To get help on how to use a particular Framework command, type:

  ```
  ./dfw help <command>
  ```

- To run a Framework command, type:

  ```
  ./dfw <command>
  ```

6 Deploying Platform components to the Framework

To create a Caplin Platform trading system, you must first deploy the Caplin Platform's core components to the relevant server machines that host the system.

> **Tip:** For information about suitable architectures for deploying Caplin Platform components, please refer to the document **Best Practices For Deploying The Caplin Platform**.

- Obtain kits and licenses from Caplin Systems for the core components and **Caplin Platform Blade**s. See Section 9 for further information about the blades you can deploy.
- Copy any licenses to the *global_config/licenses* directory.

The Liberator requires certain files for HTTPS connections and for Caplin KeyMaster (if used); the following sections explain how to set up these files.

6.1 HTTPs file setup

- If client connections to Liberator are to be via HTTPS, create the *.pem*, *.pwd* and key files as described in the **Caplin Liberator Administration Guide**.

  When these files are used in the Caplin Platform Deployment Framework, they must be named as follows:

  rttpd_https.pem

  rttpd_https.pwd

  rttpd_https.key

- Copy the .*key*, .*pem*, and .*pwd* files to the Deployment Framework's *global_config/ssl* directory on the server machine(s) on which the Liberator runs.

> **Tip:** If you do not generate your own key files, the example HTTPS files in the Liberator kit are automatically copied to *global_config/ssl* when the Liberator kit is deployed. For maximum security, replace these temporary key files with proper user-generated ones as soon as possible.

6.2 Caplin KeyMaster file setup

The Caplin Platform Deployment Framework comes with a default public key file for KeyMaster. However it is recommended that you create your own key pair for KeyMaster as described in the **KeyMaster Administration Guide**.

- Rename the generated public key file to *keymaster_public.der*
- Copy this file to the *global_config/ssl* directory of the Caplin Platform Deployment Framework on the server machine(s) on which the Liberator runs.

6.3 Deploying core component and blade kits

> **Tip:** If the core component kits are deployed and no licenses are found, the 30 minute evaluation licenses that come with these kits are automatically copied to *global_config/licenses*. You should replace these temporary licenses as soon as possible with authorized licenses supplied by Caplin Systems.
>
> Only copy licenses to the server machines on which the licensed components run.

The minimum kits that you must deploy are those for the core components – Caplin Liberator and Caplin Transformer.

- You only need to deploy a core component kit to the server(s) on which the component is to run.
- You must deploy every Caplin Platform blade kit to every server.

To deploy core component and blade kits:

- Copy the kits to the Deployment Framework's *kits* directory.
  For example:
  ```
  cp //software/test_kits/Liberator/Liberator-6.0.0-2/Liberator-6.0.0-2-i686-pc-win32.zip  ./kits
  cp //software/test_kits/Transformer/Transformer-6.0.0-1/Transformer-6.0.0-1-i686-pc-win32.zip ./kits
  ```


- Run the `deploy.sh` script on each server machine:

  `./kits/deploy.sh`

  Here is an example of the terminal output from this script:

```
Unpacking Liberator kit Liberator-6.0.0-2-i686-pc-win32.zip
Saved Liberator-6.0.0-1-i686-pc-win32.zip in kits/archive
Deploying evaluation license from Liberator kit

Deploying example HTTPS keys from Liberator kit

Unpacking Transformer kit Transformer-5.2.0-249257-i686-pc-win32.zip
Saved Transformer-5.2.0-249257-i686-pc-win32.zip in kits/archive
Deploying evaluation license from Transformer kit

Setting up active blades
Activating DirectConnection
   The Liberator direct port is 14001 on host ANDYS-T410
Activating HTTP
   The Liberator HTTP port is 18080 on host ANDYS-T410
Activating LiberatorWebsite
   The Liberator home web page is available on HTTP port 18080 on host
ANDYS-T410
Activating OpenPermissioning
Activating ServerIdentification
```

  If there are no kits to deploy, the `deploy.sh` script exits, otherwise it:

  - stops any Caplin Platform binaries that are running on the server,
  - unpacks (unzips) each kit and then moves the kits' zip files to the *kits/archive* directory,
  - activates each blade that it unpacks (see Section 9.5).

Tip: You can also run the deploy command using the *dfw* utility. See section 5.

- If an existing kit is being upgraded, the deploy script asks you whether the old kit should be removed. If you know in advance that you want old kits to be removed and replaced with the new ones, run `deploy.sh` with the `-f` option:

  `./kits/deploy.sh` **`-f`**

Note: The *deploy.sh* script deploys and activates Caplin Platform Blade kits, but *does not* start any of the Caplin Platform components.

> **Tip:** To ensure that old kit files do not take up too much space on the server, periodically check and clean out the *kits/archive* directory.

- **Now review server specific configuration – see Section 7.**

7 Reviewing server specific configuration

Once you have deployed **core component** kits and blade kits to the server machines that host the Caplin Platform trading system, you must review, and where necessary, change the server specific configuration, as explained in the following sections.

Note: You must make any configuration customizations to the Deployment Framework only by changing the contents of files in the directory *global_config* and its subdirectories. Do not directly alter any blade configuration files (see section 7.4 "Reviewing blade configuration").

Tip: The syntax used for the configuration is described in the document **DataSource For C Configuration Syntax Reference**.

7.1 Reviewing server hostnames

Server hostnames are defined in the file *global_config/hosts-defns.conf*; they specify the server machines on which the core components and Integration Adapters run.

The following instructions describe how to edit this file when the Caplin Platform trading system is deployed to a single server with no failover configured. In a multi server deployment, edit and save the file on one server machine and then copy it to the Deployment Framework on each of the other servers.

- For each Adapter blade that is deployed, add the following line to *global_config/hosts-defns.conf*:

```
define <blade_name>_PRIMARY_HOST <hostname>
```

In each line that you add, `<blade_name>` is the name of the deployed blade, and `<hostname>` is the hostname of the server machine on which the Integration Adapter runs.

Tip: In a single server deployment, `<hostname>` can be set to `localhost`, but it is good practice to always set it to the actual hostname of the server. The hostname may also be set to the IP address of the server.

- Edit the lines in *global_config/hosts-defns.conf* that define the hostnames of the servers on which the core components run. The lines look like this:

```
# Core component hosts
define LIBERATOR_PRIMARY_HOST          localhost
define TRANSFORMER_PRIMARY_HOST        localhost
```

  To edit these lines, change `localhost` to the hostname of the server on which each core component runs.

There are commented out entries in *global_config/hosts-defns.conf* for the secondary core components, but you can ignore these unless failover is being deployed (see "Configuring server hostnames" in section 11.1 "Configuring failover").

The following example shows typical host configuration for the core components and for an Adapter blade called *FITradingDataExample*.

```
#
# Liberator and Transformer hosts
#
define LIBERATOR_PRIMARY _HOST          liberator1
define TRANSFORMER_PRIMARY _HOST        transformer1

#
# Blade hosts
#
define FITradingExample_PRIMARY _HOST   prodhost3
```

7.2 Reviewing and changing configuration macros

The default settings of the **configuration macros** that configure a server component (such as a Liberator or Transformer) are defined in the file *global_config/environment-defaults.conf*. You should review the macro definitions in *environment-defaults.conf* and decide which, if any, of these definitions need to be changed for your deployment of the component.

The appendix in section 13 lists the configuration macros defined in *environment-defaults.conf*, and the configuration items whose values they set.

Note: Do not change the settings in *environment-defaults.conf*.

- To override a default configuration setting, copy the corresponding macro from *environment-defaults.conf to environment.conf* and update its value there.

  The *environment.conf* file includes the *environment-defaults.conf* file, so add your overriding macros *after* the line where *environment-defaults.conf* is included.

Tip: You can define a configuration macro multiple times, but only the last definition is effective.

The following instructions describe how to edit *environment.conf* when the Caplin Platform Deployment Framework is deployed to a single server machine. In a multi-server deployment, it is usually sufficient to edit and save the file on one server machine and then copy it to the Deployment Framework on each of the other server machines.

- Check the Java environment settings:
  - `JAVA_HOME`

    The Deployment Framework's configuration attempts to use the environment variable `JAVA_HOME`. If your server machine has an installed Java Development Kit (JDK), `JAVA_HOME` should be defined.

    Check that `JAVA_HOME` points to the correct JDK.

    On Windows, ensure that `JAVA_HOME` is defined as a Windows path not a Cygwin path.

Note: Note that when running 32 bit binaries on 64 bit machines there must be a 32 bit JDK installed, and the `JAVA_HOME` environment variable must point to it before the Deployment Framework is started.

- `JVM_BASE` and `JVM_LOCATION`

  These configuration macros define the location of the Java Virtual Machine (JVM). If certain Java-based features are activated (for example, the **LiberatorJMX** blade), Liberator attempts to load a JVM when it starts up.

  If your Java installation is a standard JDK installation, you do not need to change either of these settings. However, if the Java installation is non-standard:

  - Assuming that the java binary is located in the directory */<path-up-to-bin>/bin*, define the `JVM_BASE` macro in *global_config/environment.conf* as *<path-up-to-bin>*.
  - Define the `JVM_LOCATION` macro in *global_config/environment.conf* as the absolute path of the JVM.

Note: If you copy *global_config/environment.conf* to other server machines in a multi-server deployment, make sure the settings for `JVM_BASE` and `JVM_LOCATION` are suitable for these servers, and change the settings as required.

Note: On Windows, paths can include spaces.
If a Windows path name includes spaces, use double quotes around the name.
For example, define `JVM_BASE` as `"c:/Program Files/Java/jre6"`

- Search *environment-defaults.conf* for all configuration macros that have names containing the text `PORT`. These macros specify port numbers that must be available on the server machine on which the component runs. The following is an extract from this file.

```
define THIS_LEG                                          1
...

define LIBERATOR${THIS_LEG}_HTTPPORT                     ${THIS_LEG}8080
define LIBERATOR${THIS_LEG}_HTTPSPORT                    ${THIS_LEG}8081
```

  Because `THIS_LEG` is set to **`1`**, the macro `LIBERATOR`**`1`**`_HTTPPORT` is set to **`1`**`8080`, and the macro `LIBERATOR`**`1`**`_HTTPSPORT` is set to **`1`**`8081`.

  If ports `18080` and `18081` are not available on the server machine on which the Liberator runs, define these macros in ***environment.conf*** to values for port numbers that *are* available on that server, such as `${THIS_LEG}8090` and `${THIS_LEG}8091`.

- You can also review the other configuration macros defined in this file, but the values of these macros do not normally need to be changed.

Tip:	Consult your system administrator if you do not know what port numbers are available on a particular server machine.

7.3 Overriding configuration

The directory *global_config/overrides* contains writeable configuration files that override the configuration of core components and blades. The Liberator and Transformer kits come with override files for Liberator and Transformer configuration; these files are in

- *global_config/overrides/servers/**Liberator/etc**/*
- *global_config/overrides/servers/**Transformer/etc**/*

As an example of using an override, say you want increase the Liberator logging level to DEBUG. Change the `log-level` option in

global_config/overrides/servers/Liberator/etc/rttpd.conf
to

```
log-level DEBUG
```

and then restart the Framework.

Blade overrides

When a Caplin Platform blade is deployed, its override files are copied to directories under *global_config/overrides/<blade_name>*.

You can customize blades supplied by Caplin Systems by editing the appropriate override files. However, you do not normally need to customize built-in Config blades, other than to change port numbers (see section 9.1).

7.4 Reviewing blade configuration

Some blades supplied by Caplin come with overrides (see section 7.3) that are deployed to appropriate blade subdirectories of the overrides directory. You can override the configuration of these blades by editing the files in these subdirectories.

For example, Caplin supplies a **RefinerService** blade for the Transformer. When this blade is deployed for the first time, the *deploy.sh* script copies the *RefinerService/Transformer/etc* directory to the overrides directory *global_config/overrides/RefinerService*. You can override the configuration of the **RefinerService** blade by editing the configuration files in this overrides directory.

Note: If a blade is already deployed with configuration overrides, when a new kit for that blade is deployed, the new kit does *not* remove or modify the overrides.

8 Starting and stopping the Deployment Framework

The Deployment Framework provides scripts to start and stop Caplin Platform components on the server machines to which they are deployed:

- Navigate to the root directory of the installed Caplin Platform Deployment Framework.
- To start the system, run the script
  `start-all.sh`

Note: On Windows, before starting a multi-server deployment of the Caplin Platform Deployment Framework, first ensure that all the ports used for the components are added to the Windows Firewall exceptions.

- To stop the system, run the script
  `stop-all.sh`
- To stop the system and remove all log files that have been produced by the Platform components, run the script
  `clean-all.sh`
- To just start or stop the core components (Liberator and Transformer), use the `servers` argument:
  `start-all.sh` **`servers`**
  `stop-all.sh` **`servers`**
  `clean-all.sh` **`servers`**

Tip: You can also run the start-all, stop-all and clean-all commands using the *dfw* utility. See section 5.

9 Using Caplin Platform Blades

9.1 Built-in blades

The Caplin Platform Deployment Framework is supplied with a number of **Config blades** that implement some of the basic features of a Caplin Platform trading system. These blades are located in the *kits* directory.

The following table lists the built-in Config blades at the time of publication. The blades marked ✓ default to the active state when the Deployment Framework is installed and the relevant Platform components are started. For more about blade states, see section 9.5.

Built-in Config blades

Blade name	Use	Active when deployed?
BlotterExport	Defines blotter export configuration for the Liberator Web Module.	✗
DemoSourceExample	Contains configuration for the C-based demonstration Integration Adapter provided with the Liberator kit.	✗
DirectConnection	Defines direct connection configuration for Liberator.	✓
HTTP	Defines HTTP configuration for Liberator, using the deployment specific configuration defined in *global_config/environment.conf*.	✓
HTTPS	Defines HTTPS configuration for Liberator, using the deployment specific configuration defined in *global_config/environment.conf*.	✗
LiberatorJMX	Defines JMX monitoring configuration for Liberator.	✗
LiberatorWebsite	Provides a full status page for Liberator which is suitable for development.	✓
MinimalLiberatorWebsite	Provides a minimal status page and associated configuration for Liberator that is suitable for secure product deployment.	✗
OpenPermissioning	Defines open authentication configuration for Liberator.	✓
JavaOpenPermissioning	A Java implementation of open authentication configuration for Liberator.	✗

Blade name	Use	Active when deployed?
ServerIdentification	Prevents the Liberator's name, version number, and hostname from being transmitted to client applications in HTTP response headers and in other messages, which is considered to be good security practice. If you deactivate this blade, the above information *is* sent to clients.	✓
TransformerJMX	Defines JMX monitoring configuration for Transformer.	✗

- The built-in blades **HTTP**, **HTTPS, DirectConnection, TransformerJMX**, and **LiberatorJMX** use particular port numbers. You may need to change the port number settings for some or all of these blades to conform to your own port allocation standards as described in Section 7.2.

Note: When you run *deploy.sh* (see section 6.3 “Deploying core component and blade kits”), it lists on the terminal any ports configured by the active built-in blades when the associated binaries are deployed.

9.2 Deploying blades provided by Caplin Systems

Caplin Systems provide a number of blades in kit form that can be deployed to the Deployment Framework.

By convention the filename of each Caplin blade kit is *CPB_<blade_name>-<build_number>.zip*

- Before deploying a Caplin-supplied Adapter blade, make sure there is an entry for it in the *global_config/hosts-defns.conf* file on the server machine(s) where it is to be deployed. See section 7.1 “Reviewing server hostnames”.

- To deploy a blade kit provided by Caplin Systems to the Deployment Framework, follow the steps in Section 6.3.

9.3 Creating custom blades

You can create custom blades in Java, using the **Caplin Integration Suite**, and also in C and Lua. For details, see the documents:

- **How To Create A Platform Java Blade**
- **How To Create C And Lua Platform Blades**.

9.4 Deploying custom blades

- Before deploying a custom Adapter blade, make sure there is an entry for it in the *global_config/hosts-defns.conf* file on the server machine(s) where it is to be deployed. See section 7.1 “Reviewing server hostnames”.

- To deploy a custom blade to the Deployment Framework, follow the steps in Section6.3.

9.5 Changing the state of a blade

Blades can be active or inactive, but only features provided by active blades are available when the Caplin Platform is started. Deploying a new blade kit automatically makes the blade active. If the blade being deployed had previously been deployed and was inactive, the new deployment will make it active.

- To make inactive blades active on the server machines where they are deployed, on each server run the following command from the root directory of the Deployment Framework:

  ```
  ./kits/activate.sh <blade-name-1> <blade-name-2> <blade-name-3> ...
  ```

  For example to activate the blades **HTTPS** and **LiberatorWebsite**, run the command:

  ```
  ./kits/activate.sh HTTPS LiberatorWebsite
  ```

- To make active blades inactive on the server machines where they are deployed, on each server run the following command from the root directory of the Deployment Framework:

  ```
  ./kits/deactivate.sh <blade-name-1> <blade-name-2> <blade-name-3> ...
  ```

  For example to deactivate the blades **HTTPS** and **MinimalLiberatorWebsite**, run the command:

  ```
  ./kits/deactivate.sh HTTPS MinimalLiberatorWebsite
  ```

Note: When you run the `activate` and `deactivate` scripts, the Deployment Framework automatically stops the Platform components.

- After changing the state of a blade, restart the Caplin Platform Deployment Framework on every server machine (since a since blade is deployed to every server – see section 6.3 “Deploying core component and blade kits”).

  Use the `start-all.sh` script (see Section 8)

Tip: You can also run the activate and deactivate commands using the *dfw* utility. See section 5.

Managing mutually exclusive blades

Some blades are mutually exclusive because they provide different versions of the same feature. *Such blades should not both be activated at the same time.*

Examples of blades supplied by Caplin Systems that are mutually exclusive are:

- **OpenPermissioning** and **Permissioning**
- **LiberatorWebsite** and **MinimalLiberatorWebsite**

If you do activate two mutually exclusive blades, their configurations are loaded in alphabetical order of blade name, so the last loaded will be the active blade. For example, if you activate both the **OpenPermissioning** and **Permissioning** blades, the Permissioning blade will be the one activated.

10 Troubleshooting the Deployment Framework and blades

- To check that the basic Deployment Framework containing Liberator and Transformer has been installed correctly, follow the instructions in the *README.txt* file supplied with the kit.

> **Tip:** Always ensure that the Java environment settings are correctly defined on each server machine (see section 7.2 “Reviewing and changing configuration macros”), and check that the *hosts-defns.conf* file has an entry for every Adapter blade.

- If you have problems with the basic installation, contact Caplin Support (see “Appendix B: Contacting Caplin Support” on page 34).
- Once the basic Deployment Framework is up and running, deploy your required blades.
- The best way to check that a particular blade is correctly deployed and configured is to start the Caplin Platform Deployment Framework and verify that the feature the blade provides is available.
- If you have problems with any of the blades supplied by Caplin Systems, contact Caplin Support (see “Appendix B: Contacting Caplin Support” on page 34).

11 Failover

A Caplin Platform installation is typically deployed with multiple component instances to provide resilience against hardware, software, and network failures. To help achieve this, the hardware and software components can be arranged in processing units called “failover legs”.

In normal operation, all the components in a single failover leg – typically Caplin Liberator, Caplin Transformer, Integration Adapters, and the Bank's internal systems – work together to provide the system's functionality. If a component fails (or a connection to it, or the machine on which it runs), the operations provided by that component are taken up by an alternative copy of the component running in a different failover leg. This transfer of operation is called “failover”.

The Caplin Platform Deployment Framework provides configuration that allows failover components to be deployed to the framework.

Tip: If the **client application** that connects to the Caplin Platform trading system is **Caplin Trader**, client failover is handled at the client by **StreamLink JS**.

For further information, see “Resilience, failover, and load balancing” in the **StreamLink Overview**.

11.1 Configuring failover

Failover components for each leg can be deployed to a single server, but in general the components for each failover leg are deployed to different servers. The first step in configuring failover is to identify the servers on which the failover components will run, and this should be decided in consultation with your system administrator.

Note: Any number of components can be deployed to a single Deployment Framework, but they must all be either primary components or secondary components, and not a mixture of both.

If for some reason the same server must host both primary and secondary components, two Deployment Frameworks must be installed on that server; one containing the primary components and the other containing the secondary components.

Deploying failover components

Liberator and Transformer components are deployed to the primary and secondary server machines on which they will run, but blade components must be deployed to all servers.

- Deploy the component kits as described in section 6.3 ”Deploying core component and blade kits”.

Configuring server hostnames

- Update the file *global_config/hosts-defns.conf* with the hostnames of the server machines that host the primary and secondary failover components.

  The following code example sets the primary host server to `prodhost1` and the secondary host server to `prodhost2`.

```
define LIBERATOR_PRIMARY_HOST                   prodhost1
define TRANSFORMER_PRIMARY_HOST                 prodhost1
define FXDataExample_PRIMARY_HOST               prodhost1

define LIBERATOR_SECONDARY_HOST               prodhost2
define TRANSFORMER_SECONDARY_HOST             prodhost2
define FXDataExample_SECONDARY_HOST           prodhost2
```

Enabling failover

- In the *global_config/environment.conf* file of each primary server machine, change the definition of `FAILOVER` from `DISABLED` to `ENABLED`.
- In the *global_config/environment.conf* file of each secondary server machine,
  - Change the definition of `FAILOVER` from `DISABLED` to `ENABLED`.
  - Change the definition of `NODE` from `PRIMARY` to `SECONDARY`.
  - Change the definition of `THIS_LEG` from `1` to `2`.
  - Change the definition of `OTHER_LEG` from `2` to `1`.
  - Change the definition of `TRANSFORMER_CLUSTER_NODE_INDEX` to `1`.

The following examples show failover enabled on a primary server and a secondary server.

***global_config/environment.conf* extract for primary server**

```
# Failover configuration
define THIS_LEG                                  1
define OTHER_LEG                                 2
define FAILOVER                                  ENABLED
define NODE                                      PRIMARY
define TRANSFORMER_CLUSTER_NODE_INDEX            0
```

***global_config/environment.conf* extract for secondary server**

```
# Failover configuration
define THIS_LEG                                  2
define OTHER_LEG                                 1
define FAILOVER                                  ENABLED
define NODE                                      SECONDARY
define TRANSFORMER_CLUSTER_NODE_INDEX            1
```

Note: Enabling failover automatically enables Transformer clustering.

Starting the failover-configured system

- Start each instance of the Caplin Platform Deployment system on each server machine as described in section 8.
- If you have installed the **Caplin Management Console** (CMC), you can use it to check that all primary and secondary components have started and are interconnected as expected.

  For more information about the Caplin Management Console, see the document **Caplin Platform: Monitoring and Management Overview**.

Tip: If you encounter problems starting the system, review the *global_config/hosts-defns.conf* and *global_config/environment.conf* files on each server. If you do not find any obvious configuration errors, contact Caplin Support (see “Appendix B: Contacting Caplin Support” on page 34).

12 The Deployment Framework in source control

When developing blades using the Deployment Framework, you may want to distribute a managed version of the Deployment Framework to developers, so that generic changes to the files in *global_config* can be shared and it is easier to distribute upgrades to the Deployment Framework.

You can enable this distribution capability by adding the Deployment Framework files to a source control system. The following subsections explain how this typically might be done.

12.1 Adding the Deployment Framework to source control

To add the Deployment Framework to source control, you would typically do the following:

- Unpack the Deployment Framework to a location suitable for adding the files to source control.
- When the Deployment Framework is unpacked the directory name has the build number appended to it. Rename the directory to remove the build number.
- If the Deployment Framework has been unpacked on a Windows machine, run the command script *kits/bootstrap.sh*.

> **Note:** After following the steps above, do not run any more Deployment Framework commands on this Deployment Framework. Use it as the master copy under source control, and for putting subsequent Deployment Framework upgrades into source control (see section 12.4).

- Update the files in *global_config* with generic global configuration items if applicable.

  For example, if DEBUG logs are required during development, update the **log-level** configuration items in the appropriate overrides files.

  - Update port numbers in the *global_config/environment.conf* file

    The master copy of the Deployment Framework defines default port numbers that can often be used unchanged on the machines onto which it will be copied. However, if these port numbers are not suitable, update them as described in section 7.2.

- For convenience, *global_config/hosts-defns.conf* can be updated with the hostnames of any Adapter blades that are added in the *kits* directory (see section 7.1).

> **Tip:** If your Deployment Framework is only to be used in a development environment where the deployed Adapter blade only has a single server (no failover), the hostname can be set to `localhost`, otherwise set it to the actual hostname of the server.

- Add all the Deployment Framework files to source control.
  - Ensure that all empty directories are added to source control.
- Depending on your source control system, it may be necessary to add a dummy file to each such directory to force the creation of the directory.
  - If the source control system supports file attributes:

Add all the files under *global_config* as writeable.

  - Add all the other files as read-only.
  - Add all the scripts in the root directory and in the kits directory as executable.

> **Note:** The source control system must be able to handle the Deployment Framework links. In Cygwin the Deployment Framework links are Windows shortcuts.

- Additionally, you may want to add to source control any kits in the *kits* directory.

  For example, Liberator, Transformer, Caplin Blades, and locally developed blades

  Do not add the kits in unpacked form.

12.2 Retrieving the Deployment Framework

Once the Framework has been added to source control, you can retrieve it onto another machine, typically by following these steps:

- If you have previously retrieved the Framework to this machine, run the script *stop-all.sh* to stop the current copy of the Framework.

- Retrieve the Deployment Framework files from your source control system.

> **Note:** When retrieving the files on Windows, do this under Cygwin with the environment variable `CYGWIN` set to `winsymlinks`:
>
> ```
> export CYGWIN=winsymlinks
> ```
>
> This ensures that the links are created as Windows shortcuts.

- If this is the first time you have retrieved the Framework to this machine:
  - If no kits were added to source control (for example, Liberator, Transformer, Caplin Blades, and locally developed blades), copy any required kits into the *kits* directory.
  - Update the *global_config* files as described in section 7.2 if required (for example, if you need to change the ports used).

- If you have previously retrieved the Framework to this machine, merge the contents of the files in the new Framework's *global_config* directory with the equivalent files on the local machine, so that your existing local settings are preserved.

- Run the script *deploy.sh*.

Tip: Running *deploy.sh* moves any kits in the *kits* directory into the *kits/archive* directory.

Note: When the Deployment Framework is in use, new files are created by running the Framework scripts, such as *deploy.sh*, *(de)activate_blade.sh*, *dump-all.sh*, and *start-all.sh*. Some source control systems can detect such new files and will ask if they should be added to source control, but none of these files should ever be added in this way.

12.3 Customer updates to the Deployment Framework

Occasionally you may need to manually update some of the Deployment Framework files.

To ensure that the Deployment Framework continues to work correctly:

- Only update files located in the *global_config* directory.

  Do not update, move, or delete files in any of the other Deployment Framework directories.

- Never update, move, or delete the file *global_config/**activeblades.txt***.

12.4 Upgrading to a new version of the Deployment Framework

When a new version of the Caplin Deployment Framework is available, install it as follows:

- Unpack the new Deployment Framework and copy the files from the unpacked directory (except the files in the *global_config* directory) onto the source controlled Deployment Framework files in the master copy that was previously prepared according to section 12.1.

> **Tip:** With some source control systems you may need to "check out" the files to make them writeable before new versions can be copied over them.

- If any files are added to the Deployment Framework, this will be mentioned in the release note. Add these files to source control.

- If any files are removed from the Deployment Framework, this will be mentioned in the release note. Remove these files from source control.

- The release note will list any changes to the contents of files in the *global_config* directory.

  You must explicitly merge these changes into the corresponding files in the existing *global_config* directory in source control.

- The updated Deployment Framework can now be retrieved by other developers for local use, using source control commands.

  If the contents of any of the files in the *global_config* directory have changed, the developers must merge these changes into the corresponding files in their local *global_config* directory.

12.5 Adding a blade to source control

- When a new blade is available, you may want to add the blade kit to the *kits* directory in source control.

> **Note:** Do not unpack the blade kit before adding it to source control.

- Developers can then retrieve the blade for local use, using source control commands.
- Once retrieved, deploy the blade by running the script *deploy.sh* (see 6.3 "Deploying core component and blade kits")

13 Appendix A: Configuration macros and items

This appendix lists the **configuration macros** that are defined in the file *global_config/environment_defaults.conf*, and the configuration items that each of these macros set. Section 7.2 “Reviewing and changing configuration macros” describes how to review and modify the values of the configuration macros. For further information about the Liberator configuration items listed in this appendix, refer to the **Caplin Liberator Administration Guide**.

Configuration macro	Configuration item
JVM_LOCATION	jvm-location
LIBERATOR_BURST_MAX_${THIS_LEG}	burst-max
LIBERATOR_BURST_MIN_${THIS_LEG}	burst-min
LIBERATOR_DATASRCID_${OTHER_LEG}	datasrc-id
LIBERATOR_DATASRCID_${THIS_LEG}	datasrc-id
LIBERATOR_DATASRCPORT_${OTHER_LEG}	datasrc-port
LIBERATOR_DATASRCPORT_${THIS_LEG}	datasrc-port
LIBERATOR_DATASRC_INTERFACE_${OTHER_LEG}	datasrc-interface
LIBERATOR_DATASRC_INTERFACE_${THIS_LEG}	datasrc-interface
LIBERATOR_DIRECTINTERFACE_${THIS_LEG}	direct-interface
LIBERATOR_DIRECTPORT_${THIS_LEG}	direct-port
LIBERATOR_HTTPINTERFACE_${THIS_LEG}	http-interface and https-interface
LIBERATOR_HTTPPORT_${THIS_LEG}	http-port
LIBERATOR_HTTPSPORT_${THIS_LEG}	https-port
LIBERATOR_JMX_RMI_CLIENT_PORT_${THIS_LEG}	jvm-options
LIBERATOR_JMX_RMI_REGISTRY_PORT_${THIS_LEG}	rmi-registry-port
LIBERATOR_JMX_RMI_SERVER_HOSTNAME_${THIS_LEG}	jvm-options
LIBERATOR_RTTP_HOSTNAME_${THIS_LEG}	rttp-hostname
LIBERATOR_RTTP_SERVERNAME_${THIS_LEG}	rttp-server-name
LIBERATOR_THREADS_NUM_${THIS_LEG}	threads-num
SSLCERT_PATH	keyfile
TRANSFORMER_DATASRCID_${OTHER_LEG}	datasrc-id
TRANSFORMER_DATASRCID_${THIS_LEG}	datasrc-id
TRANSFORMER_DATASRCPORT_${OTHER_LEG}	datasrc-port
TRANSFORMER_DATASRCPORT_${THIS_LEG}	datasrc-port
TRANSFORMER_JMX_RMI_CLIENT_PORT_${THIS_LEG}	jvm-options
TRANSFORMER_JMX_RMI_REGISTRY_PORT_${THIS_LEG}	rmi-registry-port
TRANSFORMER_JMX_RMI_SERVER_HOSTNAME_${THIS_LEG}	jvm-options
TRANSFORMER_CLUSTER_NODE_INDEX	cluster-index
TRANSFORMER_CLUSTER_HEARTBEAT_TIME	heartbeat-time
TRANSFORMER${THIS_LEG}_CLUSTER_PORT}	cluster-port

14 Appendix B: Contacting Caplin Support

If you need to contact Caplin Support to report a problem with the Caplin Platform Deployment Framework, you can do so in the following ways:

Log the problem in the Caplin Issue Management System (Jira) at:	https://jira.caplin.com
or access Jira from the Caplin Client Portal at:	https://support.caplin.com
Email Caplin Support:	support@caplin.com
Telephone Caplin Support:	+44 (0) 20 7826 9601

15 Glossary of terms and acronyms

This section contains a glossary of terms, abbreviations, and acronyms used in this document.

Term	Definition
Adapter blade	A **blade** for the **Caplin Platform** that consists of an **Integration Adapter** and associated configuration.
App	An application that runs in a web browser or on a mobile device.
Blade	A re-usable software module containing the code and resources needed to implement a business feature. In this document the term blade is short for **Caplin Platform blade**.
Blade toolkit	A set of commands to create, build and export **Caplin Platform blades**.
Caplin Integration Suite (CIS)	A set of APIs and tools for creating adapters that integrate the **Caplin Platform** with external systems. It includes the **blade toolkit**.
Caplin KeyMaster	A component that integrates the **Caplin Platform** with any web-based authentication system. It generates a secure encrypted token that enables **Caplin Liberator** to identify authenticated users, and is generally used in conjunction with a single sign-on system.
Caplin Liberator	A financial internet hub that delivers data and messages in real time to and from subscribers over any network.
Caplin Management Console (CMC)	A Java application that communicates with the **Caplin Platform** and **Integration Adapters** via JMX, and provides a GUI for monitoring and controlling these components.
Caplin Platform	An integrated suite of software that supports the services and distribution capabilities needed for web trading. It consists of Caplin Liberator, Caplin Transformer, Caplin KeyMaster, Caplin Director, and Caplin Management Console. For more information, see the **Caplin Platform Overview**.
Caplin Platform blade	A **blade** designed for use with the **Caplin Platform**. A Caplin Platform blade can be an **Adapter blade**, **Config blade**, or **Service blade**.

Term	Definition
Caplin Platform Deployment Framework	A configuration and deployment environment for the **Caplin Platform** that supports **Caplin Platform blades**.
Caplin Trader	A complete development suite for creating HTML5 trading **apps**.
Caplin Transformer	An event-driven, real-time data transformation engine optimized for web trading services. These services are implemented in **Transformer Modules**.
Client application	In the context of the **Caplin Platform**, a client application is any application that uses the **StreamLink API** to communicate with **Caplin Liberator**.
Config blade	A **blade** for the **Caplin Platform** that enables a feature through configuration.
Configuration macro	A macro used in a **Deployment Framework** file to define a **Liberator**, **Transformer**, or **DataSource** configuration item and its value. For a list of the available configuration macros, see “Appendix A: Configuration macros and items”.
Container	A data type supported by the **Caplin Platform** that represents a list of items.
Core component	A Caplin Platform component that is supplied with the **Caplin Platform Deployment Framework**, but is not a blade. The core components are **Caplin Liberator** and **Caplin Transformer**.
DataSource	DataSource is the messaging infrastructure used by the **Caplin Platform** and **Integration Adapters**.
DataSource API	An API that allows server applications (including **Integration Adapters**) to communicate with the **Caplin Platform**.
DataSource application	An application that uses the **DataSource API**. Caplin Liberator, Caplin Transformer, and **Integration Adapters** are all DataSource applications.
Deployment Framework	In this document, this term is short for the **Caplin Platform Deployment Framework**.
Framework	In this document, this term is short for the **Caplin Platform Deployment Framework**.

Term	Definition
Integration Adapter	A server application that allows an external system to communicate with the **Caplin Platform**. An Integration Adapter is a **DataSource application** and is created using the **Caplin Integration Suite**.
Macro	Short for **Configuration macro**.
Service blade	A blade for the **Caplin Platform** that includes a **Transformer module** or a **Liberator Auth module**.
StreamLink API	An API that allows a client application to communicate with a **Caplin Liberator**. There are StreamLink APIs for various technologies; for example, Java, JavaScript, .NET and Silverlight applications, and Objective-C running on iOS.
StreamLink JS	The **StreamLink API** for JavaScript.
Transformer Module	A software module in Caplin Transformer that implements a service. For example, the Refiner module provides a **Container** filtering and sorting service.

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