LEXMARK

Document Distributor 4.6

SDK Guide

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Getting started

Lexmark^{TM} *Document Distributor* (LDD) is a system for capturing paper documents and converting them to digital format, or capturing existing digital documents and then processing and routing these documents according to your business processes. Users can submit paper documents from multifunction printers, or they can submit digital documents from individual computers. For more information about Lexmark Document Distributor, see the *Lexmark Document Distributor Administrator's Guide*, available at **http://support.lexmark.com**.

This guide covers the LDD *software development kit* (SDK), which is used to build the custom solutions that model business processes in the Lexmark Intelligent Capture system and LDD system, as well as their supporting components.

Prerequisite skills for developing workflow solutions

The following skills are essential for developing LDD workflow solutions with the LDD SDK:

- Understanding of LDD 4.x (See the *Lexmark Document Distributor Administrator's Guide*, available at **http://support.lexmark.com**)
- Basic knowledge of usage and network configuration of Lexmark *multifunction printers* (MFPs)
- Object-oriented programming basics:
  - Variables
  - Arrays
  - Conditional statements
  - Loops
  - Logic operators
  - Functions
  - Objects
- JavaScript 1.2
- Eclipse Development Platform (**http://www.eclipse.org**)

Prerequisite skills for developing LDD system components

The following skills are essential for developing LDD system components with the LDD SDK:

- Code development within Java Platform, Standard Edition
- XML
- Management of Apache Tomcat Servlet containers
- Web services with WSDL and SOAP
- Spring Framework
- Development for the Lexmark *Embedded Solutions Framework* (eSF)

  Contact Lexmark Professional Services for more information about developing for the Lexmark eSF.

Understanding workflow solutions

A *workflow solution* determines the specifics of each stage of a job in LDD to meet a business need. Each workflow solution contains scripts that determine the specifics of each stage of a job in LDD.

The stages of a job in LDD are the following:

1 Document capture

2 Document processing

3 Document routing

4 Confirmation

See the *Lexmark Document Distributor Administrator's Guide* for more information about each stage. A workflow solution usually provides a new *profile*, or a type of job a user can initiate, on a device or software client to which it is deployed.

Some scripts may be scheduled to run at particular times.

A workflow solution contains some or all of the following elements:

- **Scripts**—These define the actions executed when a workflow solution is initiated. Scripts can be static, or they may solicit user input to make decisions about processing and routing documents. For example, a script that processes bank loans may request additional user input such as a branch name, account number, or social security number. Scripts are not required if a solution is used only to install an eSF application or component.

- **Policy**—These are settings for the solution and the printers to which it is deployed:

  - **Device settings**—This is the configuration required on devices to support the jobs. This configuration typically includes profiles but can include almost any device setting.

  - **Solution settings**—These are settings exposed by a solution that allow its jobs or device configurations to be adjusted in the field. Some settings are global to the solution across all devices, while others vary from one group of devices to another.

- **eSF application**—This is an application installed on the printer to provide functionality needed by the solution, such as delayed sending of scanned documents.

- **Components**—These are JAR files that provide services not available in the base LDD installation, such as interaction with a custom *enterprise content management* (ECM) system.
- **Formsets**—These are custom form files used for merging data with standard forms.
- **Custom reports**—These are reports created by a solution developer that present custom data.
- **Solution Status Page**—This is an easy-to-use Web page that can be included with solutions to simplify viewing system status and performing basic operations related to a solution.

Workflow solution scripts are written using JavaScript. See a JavaScript reference for information on core programming methods. Lexmark Document Distributor includes the LDD SDK for development of scripts, supporting components, and packaged solutions.

Understanding solution types

Three basic types of solutions can be developed depending on business needs:

- A *device solution* allows users to submit documents and respond to prompts on a printer.
- A *client software solution* allows users or other applications to submit documents electronically.
- A *hybrid solution* uses a supporting eSF application on printers to deliver advanced functionality, such as cached or scheduled job submissions to the LDD system.

Additionally, you can include functionality from more than one of these types in a single solution by including a separate script for each type.

You can add features for each solution type. See the following table for more information.

Features for solution types

Feature	Device solution	Client software solution	Hybrid solution
Initiation of workflow	Printer	Client computer or external application, such as part of an ECM system	Printer
Document submission	Scanner glass or automatic document feeder (ADF)	Client software on a computer; acceptable file types are determined by each solution	Scanner glass or automatic document feeder (ADF)
Workflow control	LDD system	LDD system	Printer
Main processing load	LDD system	LDD system	Shared; the printer handles prompts and user interaction, and the LDD system may carry out additional processing and manage routing
User prompt support	Yes	Lexmark Document Server Printer Port	Yes
Cached or scheduled job submission support	No	Conditional; caching or scheduling must be handled by an external application	Yes
eSF application integration support	Yes	No	Required

Feature	Device solution	Client software solution	Hybrid solution
Custom home screen support	Yes	No	Yes
Job confirmation customization	Contained in solution script	Contained in solution script	Contained in eSF application
Example included as LDD SDK template	TestMFP	TestSNS	TestHybrid **Note:** The included source code of the eSF application file can be compiled only with the eSF SDK, not the LDD SDK.

Version compatibility of workflow solutions

Solutions developed for LDD 4.4 or 4.5 are compatible with an LDD 4.6 system without modification.

Solutions developed for LDD 4.6 are *not* compatible with an LDD 4.5 or older system without modification.

Understanding components

A component is a Java application built on the Spring Framework that is used to provide extended functionality to workflow solutions.

What is the LDD SDK?

The LDD SDK is a group of plug-ins included with Lexmark Document Distributor for the Eclipse IDE, which is available from **http://www.eclipse.org**.

The SDK provides tools for creating solutions for Lexmark Document Distributor, allowing you to write scripts, edit solution settings and device policies, develop components, and package finished solutions.

Minimum system requirements

Category	Requirement
Operating system	Any of the following: • Windows Server 2008 Standard or Enterprise Edition • Windows Server 2003 Standard or Enterprise Edition with SP2 • Windows XP Professional with SP2 or SP3
Processor	2GHz
RAM	1GB
Hard disk drive space	400MB, including space for JDK, Eclipse IDE, and LDD SDK
Video	Capable of displaying 1024 x 768 or higher resolution

Supported printers

e-Task 4 printers	e-Task 3 printers	e-Task 2+ printers	e-Task 2 printers	e-Task printers[1]	X642 printers
• MS610 • MS810, MS812 • MX410, MX510, MX511 • MX610, MX611 • MX710, MX711 • MX810, MX811, MX812 • CS510 • CX410 • CX510	• X548 • 6500 • X746, X748 • X792 • X950, X952, X954 • C748 • C792 • C925 • C950	• X463, X464, X466 • X651, X652, X654, X656, X658 • X734, X736, X738 • X860, X862, X864 • T656[3]	• X644, X646 • X772 • X782 • X850, X852, X854 • X940, X945 • T654[3] • W850[3]	• X620[2] • X632, X634[2] • X752[2] • X820[2] • X830, X832[2] • X912[2] • C520, C522. C524[3] • C530, C532, C34[3] • C732, C734, C736[3] • C780, C782[3] • C920[3] • C935[3] • E450[3] • E460, E462[3] • T640, T632, T644[3] • T650, T652[3] • W840[3]	X642

[1] These printers do not support eSF applications used in hybrid solutions.

[2] These printers may be identified as "C", "T" or "W" models in Lexmark Management Console.

[3] These single-function printers do not support all prompts supported by multifunction printers. For a list of supported prompts, see "Prompts supported by single-function printers" on page 74.

Notes:

- For more information about the latest device and firmware level support, see the *Readme*.
- Double-byte characters are not supported by all printer models. For more information, see "Double-byte character support" on page 74.

Supported ECM platforms

- IBM FileNet P8, with one of the following components:
  - Content Services connector
  - Image Services connector
  - Content Engine
  - Content Engine with shared repository
- Microsoft Office SharePoint Server 2007 and Windows SharePoint Services 3.0
- EMC Documentum 5.3
- Autonomy iManage WorkSite with WorkSite Server 8.2 or 8.5

Notes:

- Integration with ECM systems may require specific licenses.
- For ECM platforms that are not capable of direct integration, LDD can save documents and a text file containing metadata to a directory where an ECM system is configured to poll for files.

Getting support

When requesting technical support, provide the following information:

- Description of the problem
- Steps to reproduce the problem, if possible
- Operating system, version, and service pack level
- JDK and JRE version
- Eclipse version
- LDD SDK plug-in versions

  Note: You can find the SDK plug-in versions by clicking **Help** > **About Eclipse Platform**, and then clicking **Plug-in Details** in the dialog that appears. LDD SDK plug-ins list the provider as "Lexmark International Inc."

- A ZIP file containing the source files in your solution project
- The current .solution file if the problem is with a built solution or installation
- The Eclipse error log

  Note: The Eclipse error log is the file ".log" in the .metadata folder within your workspace folder.

Preparing for development

Installing the development environment

Note: Tasks performed within Eclipse IDE are described for version 3.5.0 (Galileo). Instructions may vary for other versions of Eclipse.

1 If necessary, install the Java SE 6 Development Kit (JDK) and Java Runtime Environment (JRE), available from **java.sun.com**.

2 If necessary, install the Eclipse IDE for Java Developers, available from **eclipse.org**.

3 Open Eclipse.

4 Change the workspace to a folder name with no spaces. For more information, see the documentation for Eclipse.

5 If the Welcome screen appears, then click **X** on the Welcome tab.

6 If you connect to the Internet through a proxy, then set up the proxy connection in Eclipse.

   Note: For more information, see the documentation for Eclipse.

7 Install the LDD SDK plug-in:
   - For offline installation using a provided ZIP file:
      a Extract the contents of the ZIP file to a new folder on your computer.
      b In Eclipse, click **Help** > **Install New Software** > **Add** > **Local**.
      c Navigate to the folder where you extracted the plug-in, and then click **OK**.
      d Click **OK** to add the local site.
      e Select the **SBT** check box, and then click **Next**.
      f Review the list of items to be installed, and then click **Next**.
      g Select the **I accept the terms in the license agreements** check box to accept the license agreement, and then click **Finish**.
      h If you receive a security warning that indicates the software contains unsigned content, then click **OK**.
      i When prompted, click **Yes** to restart Eclipse.
   - For online installation (inside the Lexmark network):
      a In Eclipse, click **Help** > **Install New Software** > **Add**.
      b Type **http://hyperion.mw.lexmark.com/lddsdk/current/** in the Location field, and then click **OK**.
         If the Password Required window appears, enter your user name and password, and then click **OK**.
      c Select the **SBT** check box, and then click **Next**.
      d Review the list of items to be installed, and then click **Next**.
      e Select **I accept the terms in the license agreements** to accept the license agreement, and then click **Finish**.
      f If you receive a Security Warning that indicates the software contains unsigned content, then click **OK**.
      g When prompted, click **Yes** to restart Eclipse.

         Note: When using online installation, you can automatically update the plug-in by configuring the options in the Automatic Updates section of the Preferences window.

   After the Solution Builder Toolkit has been successfully installed, the LDD SDK menu is available.

8 Activate the Lexmark Solution Development perspective:

Perspectives provide predefined layouts and editor sets in Eclipse. The Solution Builder Toolkit includes the Lexmark Solution Development perspective that should be used when developing solutions for LDD 4.x.

a Click **Window** > **Open Perspective** > **Other**.

b Select **Lexmark Solution Development** from the list, and then click **OK**.

While using the Lexmark Solution Development perspective, the title bar displays "Lexmark Solution Development," and the LDD Build Log appears on the Workbench.

9 Install an Eclipse plug-in for editing JavaScript files, such as JSEclipse.

To install JSEclipse, add the site `http://hyperion.mw.lexmark.com/lddsdk/jseclipse/` in the Available Software dialog in Eclipse.

Notes:

- A JavaScript plug-in is not required. However, if you do not install such a plug-in, you must manually associate JavaScript files with the Eclipse text editor. Automatic completion of LDD script elements is available only with JSEclipse.

- The JSEclipse plug-in requires a workspace folder name with no spaces.

10 Enable the auto-complete libraries for JSEclipse packaged with the Solution Builder Toolkit:

a In Eclipse, click **LDD SDK** > **Update JSEclipse Autocomplete**.

Note: The menu item is unavailable if JSEclipse is not installed.

b When prompted, click **Yes** to restart Eclipse.

Note: When updating plug-ins, make sure to activate the Lexmark Solution Development perspective.

Manually associating JavaScript files with Eclipse

You must manually associate JavaScript files with the Eclipse text editor if a plug-in for editing JavaScript files (such as JSEclipse) is not installed.

1 In Eclipse, click **Window** > **Preferences**.

2 In the Preferences dialog, select **General** > **Editors** > **File Associations**.

3 Beside the File types list, click **Add**.

4 Type `*.js`, and then click **OK**.

5 Make sure the new entry for *.js is selected, and then click **Add** beside the Associated editors list.

6 Make sure the **Internal Editors** check box is selected, and then select **Text Editor** from the list.

7 Click **OK**, and then click **OK** in the Preferences dialog.

Accessing the *Lexmark Document Distributor Script Reference Guide*

1 In Eclipse SDK, click **LDD SDK** > **Reference Material**.

2 On the page that appears, click **LDD 4.6 Script Reference** for working with LDD 4.6 scripts. The script reference guides for previous versions may also be available.

3 Select topics from the menu at the left side of the page.

Developing workflow solutions

Best practices for solution design

Follow these guidelines when developing the workflow and user interface of a solution:

- Make it clear to the user when document input is expected. Depending on the nature of the solution, a prompt asking the user to place a certain document on the scanner may be beneficial. Alternately, if the purpose of the solution makes the expectation of document input obvious, a prompt may be unnecessary.

- When possible, present all prompts before scanning the document. If a user does not know some of the information requested through prompts, then it is best if the job can be canceled before scanning since it takes the most time. On e-Task 2 printers, you may choose to present prompts or confirmation after scanning and partially processing the document when appropriate. On e-Task printers, however, no prompts can be used after the scan task.

- Handle user-initiated cancels at all stages.

- When possible, allow the user to batch process multiple documents. In order to avoid forcing the user to wait between scan tasks, scan and store all documents, and then begin processing and routing.

- To help avoid unexpected errors due to incorrect or missing input, validate documents as much as possible to make sure the correct documents and the correct number of documents or pages are scanned.

- When possible, complete all prompting and scanning before beginning processing and routing. Again, on e-Task 2 printers, you may choose to present prompts or confirmation after scanning and partially processing the document when appropriate. Users do not expect a long wait between prompts, so minimize such intermediate processing.

- After processing and routing, provide confirmation of success or failure to the user. On e-Task devices, confirmation must be printed, and no further action may be taken in case of failure. On e-Task 2 devices, additional prompts can be used to deliver confirmation, and an opportunity to take corrective action may be presented to the user in case of failure.

- Report the percentage of completion to the system when the task is completed, or as accurately as possible when the task fails.

- Handle all errors and recover whenever possible. On e-Task 2 devices, an opportunity to take corrective action may be presented to the user in case of errors. For example, the user may be prompted to rescan a document when a bar code could not be read because it was scanned upside down. On e-Task devices, errors that occur during or after a scan can be reported only on the confirmation page.

- Log all errors regardless of recovery ability, and report them to the user whenever possible. Log non-fatal errors at the "ERROR" level and fatal errors at the "FATAL" level.

- Log potential problems that are not errors at the "WARN" level.

- Log only messages that an administrator needs to see during normal operation at the "INFO" level in order to save space in the log and maintain better system performance. Remember that an administrator can see the overall completion status of a job without a log message using the Jobs task in LMC.

- Log messages at the "DEBUG" level wherever they may later help determine the location of a bug. Messages at the "DEBUG" level are not recorded unless specifically enabled by an administrator, so these messages do not affect space and performance during normal operation.

Creating a new workflow solution project

Each LDD solution is maintained as a project within Eclipse.

1 In Eclipse, click **File** > **New** > **LDD 4.x Solution**.

 Note: If the Lexmark Solution Development perspective is not open, then click **File** > **New** > **Project**. Select **LDD 4.x Solution** from the Lexmark folder, and then click **Next**.

2 Type a container name for the project.

 The container name is the name of the workflow solution project in Eclipse IDE.

3 Configure optional properties:

 a To use a solution name different from the container name, clear the **Use Project Name** check box, and then type a solution name.

 The solution name is the name of the solution displayed in LMC when the solution is installed.

 b To start a workflow solution project at a version other than 1.0, type a value in the Initial Version field.

 c To use a package name different from the default that is based on the solution name, clear the **Use Default** check box, and then type a package name.

 The package name is the name of the solution file built from the workflow solution project.

4 Select the version of the LDD system where the solution will be installed, and then click **Next**.

5 Select the template most appropriate for the solution you plan to develop from the Available Templates list, and then click **Next**.

 To see a description of a template, select that template from the Available Templates list.

6 Type a description of the solution and the name of the author, and then click **Finish**.

 The Lexmark Solution Development perspective is opened if another perspective was open before the new project is created.

Understanding the contents of a workflow solution project

The following folder structure details the contents of a workflow solution project. Some folders may not appear in all solutions.

 ProjectFolder—This is the Container folder that contains all contents of the project. The Container folder is named when creating the project.

 docs—This contains files for use during development. The contained files are not included with the compiled solution.

 platform—This contains files and components accessed by the solution and shared with other solutions. All contents of this folder are copied to the application folder (\Lexmark\Solutions\apps\wf-ldss\) when the solution is installed on a system. This folder is accessible by scripts through the `taskInfo.platformDir` property.

 Note: If files are included in this folder, then deployment of the solution may require a restart of the LDD system. Files that do not need to be shared with other solutions should be placed in the src\solution \WEB-INF\ and src\solution\WEB-INF\lib\ folders instead.

src—This contains the source files of the project.

> **conf**—This contains the configuration files for the project.

>> **devicePolicy.ldd**—This is the configuration file that manages the profiles and associated policy settings associated with a solution.

>> **forms.ldd**—This is the configuration file that manages the formsets included with or linked to the solution.

>> **reports.ldd**—This is the configuration file that manages the custom reports included with the solution.

>> **solutionSettings.ldd**—This is the configuration file that manages the global and local solution settings available for a solution. Settings created here are accessible by scripts and can be changed using Lexmark Management Console.

>> **statusPage.properties**—This is the configuration file that manages the look and feel of the custom status page that may be used instead of Lexmark Management Console for non-technical users.

> **esf**—This contains any .fls files for eSF applications used with a hybrid solution.

> **esf-app-source-code**—This contains the source files from any eSF applications used with a hybrid solution.

> **forms**—This contains any formsets included with the solution. (Use the **forms.ldd** configuration file to add forms.)

> **images**—This contains images associated with the solution, such as home screen images added using the device policy editor. Files in this folder are copied to the images\ folder of the solution on the LDD system when the solution is installed.

> **reports**—This contains compiled Jasper custom report files associated with the solution. (Use the **reports.ldd** configuration file to add reports.)

> **scripts**—This contains the JavaScript scripts included in the solution. This folder may be empty for solutions that deploy only an eSF application or LDD component. Each main script located here should be assigned to a profile in devicePolicy.ldd.

>> **scheduled**—This contains scripts that can be scheduled using Lexmark Management Console after a solution is deployed.

> **solution**—This contains files and components accessed only by the current solution. This folder is accessible by scripts through the `taskInfo.solutionDir` property.

>> **WEB-INF**—This contains property files for custom components specific to a solution that should not be shared with other solutions.

>>> **lib**—This contains custom components specific to a solution that should not be shared with other solutions.

target—This contains the compiled solution after a project build, in addition to associated class files and XML descriptor files. This folder appears only in a new project after the first build.

> **Note:** This folder may be deleted to ensure a clean build.

> **install**—This contains the compiled solution, with the extension .solution. The file contained here can be distributed independently as a complete solution.

> **solution**—This contains copies of all files contained in the solution file from the time of the build.

Note: File and folder names within a workflow solution project cannot contain double-byte characters. However, files themselves may contain double-byte characters.

Managing solution projects

The following operations are performed the same way for LDD solution projects and for any project in Eclipse:

- Importing existing projects
- Importing archive files

- Creating scripts
- Building projects

For more information, see the Eclipse documentation.

Editing the properties of an existing workflow solution project

After creating or importing a solution, you can change the name of the solution, build version, package name, and version of the LDD server where the solution is installed.

1 Right-click the solution folder in the Package Explorer pane, and then click **Properties**.

2 Select **LDD 4.x Properties** from the list.

3 Edit the properties.

The Solution Name, Build Version, Package Name, Valid For, and LDD Server Target attributes can be edited from the General tab, while the Description and Author attributes can be edited from the Description tab.

4 Click **OK**.

Note: Changing the LDD server target does not modify the contents of scripts in any way. Scripts must be manually converted between different versions.

Referencing a workflow solution project

1 Make sure the project to be referenced has been built. If Build Automatically is not enabled on the Project menu, then do the following:

  a Select the workflow solution project in Package Explorer.

  b Click **Project** > **Build Project**.

The target\install folder should contain a solution file after a successful build.

2 Determine whether to include or reference the solution project:

- An included solution does not update with changes made to the original component project. Do the following to include a solution:

  a Make sure the parent solution project appears in Package Explorer.

  b Click and drag the solution file from the target\install folder of the solution project to be included to the root folder of the parent solution project.

- A referenced solution updates if the original solution project is changed and rebuilt. Do the following to reference a solution:

  a Right-click the parent solution project folder in the Package Explorer pane, and then click **Properties**.

  b Select **Project References** from the list.

  c Select the check box beside the solution project you want to reference in the workflow solution project.

    Note: A project must appear in Package Explorer to appear in the Project References list.

  d Click **OK**.

Evaluating code quality with JSLint

To check for problems in your script code during builds, you can enable the included version of JSLint. JSLint evaluates code for overall quality, including syntax, structure, and style conventions, which may help avoid runtime errors by finding issues that cause compiler errors.

For more information about the specific checks carried out by JSLint, see the JSLint instructions at **www.jslint.com**. Note that some checks specific to the use of JavaScript with HTML are omitted from LDD. Additionally, a different comment, described in the following, is used to identify functions defined later in or outside of the script and LDD objects as global variables.

When JSLint is enabled, code is parsed during project builds. Any warnings generated are shown in the Problems view.

Note: If the Problems view does not appear in Eclipse, then see the documentation for Eclipse.

To enable JSLint during the build:

1 In Eclipse, click **Window** > **Preferences**.

2 In the category list, expand **Lexmark**, and then select **JSLint**.

3 Select **Enable JSLint**.

4 If necessary, configure the checks to be carried out by JSLint, and then click **OK**.

Note: Project builds for large solutions may be noticeably slower when JSLint is enabled. You may want to enable JSLint only while debugging.

Avoiding warnings for functions and LDD objects

To identify LDD objects and indicate functions defined later in or outside of the script to JSLint, use the comment **/**jsLint *variableName* */**.

For example, to identify the LDD top-level objects, include this comment in the script:

```
/**jsLint caller,confirm,confirmTarget,context,credentials,printerIP,taskInfo */
```

Understanding types of scripts

Using profile scripts

Most workflow solution projects include at least one profile script, which, after being assigned to a profile using the Device Policy Editor, can be executed from a printer or software client. A profile script may have any file name other than the names reserved for auto-configure scripts, and each profile script file should contain a **main()** function.

All LDD objects are available for use in profile scripts, and profile scripts can access library scripts.

The script file TestMFP.js in the TestMFP example template is an example of a profile script.

Using library scripts

Library scripts, which can be accessed only by other scripts, can be used to contain common functionality, such as functions for database access, logging, and progress monitoring. Each function in a library script should use objects and methods appropriate only for scripts that will call it. For example, a library script called by a scheduled script should not use prompt objects or any scan methods.

The script file library.js in the TestSNS example template is an example of a library script.

Adding a library script to a solution

A library script does not require a specific file name. To begin adding a library script, add a blank script in the scripts\ folder.

To define the script as a library script, a specific structure is used:

- Begin the library section of the script with an empty **library()** function.
- Use the format **library.prototype.<functionName> = function(<arguments>)** for function headers.
- Create a new **library** object. This **must** be done as the last line of the script.

The following example shows the basic structure of a library script:

```
function library()
{
}
…
library.prototype.myFunction = function(myArgument1,myArgument2)
{
  …
}
…
new library();
```

Accessing the functions of a library script

To access the functions of a library script from another script, create an object reference to the library script using the **context.callTask()** method. The functions in the library script are then available as members of the new object.

The first argument in the **callTask()** method is always **taskInfo.solutionName**. The second argument is the script file name with no extension. For example, if the previous library script is named "mylibrary.js," the following line creates an object reference to that library:

```
var myLib = context.callTask(taskInfo.solutionName, "mylibrary");
```

The included functions can then be accessed as follows:

```
myLib.myFunction(arg1,arg2)
```

Using auto-configure scripts

If you have detailed knowledge of the LDD system where a solution will be deployed, then you can write an auto-configure script that can:

- Create a device group.
- Add printers to a device group.
- Deploy the solution to a device group.
- Configure home screens.
- Discover devices.
- Perform a policy update.
- Set the server online.

Auto-configure scripts can be triggered by several events. The event that triggers the script is determined by the name of the script:

- **configureNewSolution.js**—This is triggered when a solution is installed to the LDD system.
- **configureNewSolutionServer.js**—This is triggered when a solution is first added to each LDD server in the LDD system.
- **configureUpgradeSolution.js**—This is triggered after an existing solution is upgraded in the LDD system.
- **configureUpgradeSolutionServer.js**—This is triggered after a solution is upgraded on each server in the LDD system.
- **configureRemoveSolution.js**—This is triggered when a solution is removed from the LDD system.
- **configureRemoveSolutionServer.js**—This is triggered when a solution is removed from each server in the LDD system.
- **configureSolutionRestart.js**—This is triggered when a solution is installed or upgraded, or a server is restarted, in which case it is run for each solution.

To add an auto-configure script to a workflow solution, create a script using the selected name in the scripts\ folder of the workflow solution project.

Note: If a solution performs several actions using an auto-configure script and you are deploying the solution directly to an LDD system by exporting it from Eclipse, then you may need to increase the value of the Solution Export Wait Time setting in the Lexmark preferences to allow enough time for deployment.

Using auto-configure methods

All methods used for auto-configure are members of the **caller** object, which is detailed in the *Lexmark Document Distributor Script Reference*. These methods can also be used in a scheduled script in which the **caller** object is assigned as follows:

```
var caller = context.getObject("autoconfigUtilities")
```

For an example of an auto-configure script that uses several of the available methods, see the configureNewSolution.js file in the TestMFP template in Eclipse. Additionally, the simplelog.js file in the scheduled\ folder of the TestMFP template contains the preceding **var** statement and uses auto-configure methods.

Configuring the home screen with auto-configure

The method **caller.setWelcomeScreen(groupName, solutionName, fileName)** configures the home screen for the specified solution in the specified group. The specified XML file, located in the src\solution\welcomescreen\ folder, provides a description of the layout of the home screen.

The description of a home screen for an individual device class is specified using the element **<welcomescreen model="*class*">**, where *class* is one of the following:

- **etask**—e-Task multifunction printers
- **sfp_etask**—e-Task single-function printers
- **etask2**—e-Task 2 multifunction printers
- **etask2+**—e-Task 2+ multifunction printers
- **sfp_etask2**—e-Task 2 single-function printers
- **etask3**—e-Task 3 multifunction printers
- **sfp_etask3**—SFP e-Task 3 single-function printers

- **x642**—X642 printers
- **T656**—T656 printers (single-function printer with a touch screen)

The layout is specified as an integer in the contents of the **<buttonLayout>** element. The settings apply as shown in the following table.

Buttons for the home screen are contained within a **<buttons>** element. Each button is defined using the **<button>** element, which contains the following child elements to define the properties of a button:

- **<action>**—This specifies the action associated with the button. Values available for each device class are shown in the following table. To leave a space on the home screen, do not include this element. If **Placeholder** is specified for the action, then do not specify any other properties for the button.
- **<displayText>**—This is the custom display text for the button.
- **<displayIcon>**—This is the custom icon for the button.
- **<profileName>**—This is the profile to assign to the button when **<action>** contains **Single Profile**, **Copy + Profile**, **Fax + Profile**, or **Email + Profile**.
- **<shortcut>**—This is the shortcut number assigned to the button when **<action>** contains **Shortcut**.

Device class	Valid contents of the **<buttonLayout>** element	Valid contents of the **<action>** element
etask	1–9 The value specifies the number of buttons.	**Standard printer functions** • **Copy** • **Fax** • **Email** • **Forms** • **Printer Panel** **LDD profile** • **Single Profile** **List of profiles** • **Profiles** **Shortcut** • **Shortcut** **Standard functions overridden by profiles** • **Copy + Profile** • **Fax + Profile** • **Email + Profile**
sfp_etask	1–*n* The value specifies the number of buttons and should be the same as the number of **<button>** elements defined.	**LDD profile** • **Single Profile**

Device class	Valid contents of the `<buttonLayout>` element	Valid contents of the `<action>` element
`etask2`	1–9 The value specifies the number of buttons on the first page of the home screen. Three subsequent nine-button pages are included in the layout, providing 27 additional buttons.	**Standard printer functions** • `Copy` • `Fax` • `Email` • `Ftp` • `Held Jobs` • `Search Held Jobs` • `Held Faxes` • `Lock Device` **LDD profile** • `Single Profile` **Shortcut** • `Shortcut` **Placeholder for an eSF application installed with the solution** • `Placeholder`

Device class	Valid contents of the `<buttonLayout>` element	Valid contents of the `<action>` element
`etask2+`	1–9 The value specifies the number of buttons on the first page of the home screen. Three subsequent nine-button pages are included in the layout, providing 27 additional buttons.	**Standard printer functions** • `Change Language` • `Copy` • `Copy Shortcuts` • `Fax` • `Fax Shortcuts` • `Email` • `Email Shortcuts` • `Ftp` • `Ftp Shortcuts` • `Held Jobs` • `Search Held Jobs` • `Held Faxes` • `Usb Drive` • `Bookmarks` • `Jobs by user` • `Lock Device` **LDD profile** • `Single Profile` **List of profiles** • `Profiles` **Shortcut** • `Shortcut` **Placeholder for an eSF application installed with the solution** • `App Reservation` • `Placeholder` **Standard functions overridden by profiles** • `Copy + Profile` • `Fax + Profile` • `Email + Profile` • `Ftp + Profile`

Device class	Valid contents of the `<buttonLayout>` element	Valid contents of the `<action>` element
`sfp_etask2+`	1–9 The value specifies the number of buttons on the first page of the home screen. Three subsequent nine-button pages are included in the layout, providing 27 additional buttons.	**Standard printer functions** • `Change Language` • `Search Held Jobs` • `Held Jobs` • `Usb Drive` • `Bookmarks` • `Jobs by user` • `Lock Device` **LDD profile** • `Single Profile` **List of profiles** • `Profiles` **Shortcut** • `Shortcut` **Placeholder for an eSF application installed with the solution** • `App Reservation` • `Placeholder`

Device class	Valid contents of the `<buttonLayout>` element	Valid contents of the `<action>` element
`etask3`	1–10 The value specifies the number of buttons on the first page of the home screen. Three subsequent ten-button pages are included in the layout, providing 30 additional buttons.	**Standard printer functions** • `Change Language` • `Copy` • `Copy Shortcuts` • `Fax` • `Fax Shortcuts` • `Email` • `Email Shortcuts` • `Ftp` • `Ftp Shortcuts` • `Held Jobs` • `Search Held Jobs` • `Held Faxes` • `Usb Drive` • `Bookmarks` • `Jobs by user` • `Lock Device` **LDD profile** • `Single Profile` **List of profiles** • `Profiles` **Shortcut** • `Shortcut` **Placeholder for an eSF application installed with the solution** • `App Reservation` **Standard functions overridden by profiles** • `Copy + Profile` • `Fax + Profile` • `Email + Profile` • `Ftp + Profile`

Device class	Valid contents of the `<buttonLayout>` element	Valid contents of the `<action>` element
`sfp_etask3`	**1–4** The value specifies the number of buttons on the first page of the home screen. Three subsequent four-button pages are included in the layout.	**Standard printer functions** • `Change Language` • `Search Held Jobs` • `Held Jobs` • `Usb Drive` • `Bookmarks` • `Jobs by user` • `Lock Device` **LDD profile** • `Single Profile` **List of profiles** • `Profiles` **Shortcut** • `Shortcut` **Placeholder for an eSF application installed with the solution** • `App Reservation`
`x642`	**1–4** If the value is **1–3**, it specifies the number of buttons. If the value is **4**, it specifies a four-page layout of four buttons each, providing 16 total buttons.	**Standard printer functions** • `Copy` • `Fax` • `Email` • `Ftp` • `Held Jobs` **LDD profile** • `Single Profile` **Shortcut** • `Shortcut` **Placeholder for an eSF application installed with the solution** • `Placeholder`

Device class	Valid contents of the `<buttonLayout>` element	Valid contents of the `<action>` element
`t656`	**1–9** The value specifies the number of buttons on the first page of the home screen. Three subsequent nine-button pages are included in the layout, providing 27 additional buttons.	**Standard printer functions** • `Change Language` • `Held Jobs` • `Search Held Jobs` • `Usb Drive` • `Bookmarks` • `Jobs by user` • `Lock Device` **LDD profile** • `Single Profile` **List of profiles** • `Profiles` **Shortcut** • `Shortcut` **Placeholder for an eSF application installed with the solution** • `App Reservation` • `Placeholder`

The placement of each button is determined by the order in which the buttons are defined.

- **Multifunction printers and single-function printers with touch screens**—The first button specified is the button nearest the upper-left corner of the home screen in the specified layout. The order of the buttons progresses left-to-right, and then top-to-bottom by rows. If subsequent pages are present, then each page begins after all buttons have been specified on the previous page. To leave a blank space in the specified layout, define the button using the **`<button>`** element, but do not include the **`<action>`** element or any other properties of the button.

- **Single-function printers without touch screens**—The buttons appear as menu items in the order in which they are defined.

The following sample XML file specifies a home screen for e-Task 2 devices:

```
<?xml version="1.0" encoding="UTF-8"?>
<welcomescreen model="etask2">
    <buttonLayout>5</buttonLayout>
    <buttons>
        <!-- Buttons in page 1 -->
        <!-- A layout of 5 buttons is used, but only positions
            2 and 3 on the first page contain buttons -->
        <button/>
        <button>
            <action>Copy</action>
        </button>
        <button/>
        <button>
            <action>Fax</action>
            <displayText>My Fax</displayText>
        </button>
        <button/>
```

```
        <!-- Buttons in page 2 (page 2 starts after specifying all
             5 buttons on the first page) -->
        <!-- Place a profile button in position 5, using empty
             buttons for the first 4 -->
        <button/>
        <button/>
        <button/>
        <button/>
        <button>
            <action>Single Profile</action>
            <profileName>TestMFP</profileName>
            <displayText>Test MFP</displayText>
            <displayIcon>images\\testmfp_up.gif</displayIcon>
        </button>
    </buttons>
</welcomescreen>
```

An example file for the home screen on each device class can be found in the \src\solution\welcomescreen folder of the TestMFP example template.

Using forms merge scripts

You can use forms merge scripts to perform advanced management of forms merge operations or modify forms merge data and output documents. Using a forms merge script, you can:

- Send merged documents to multiple destinations, including e-mail messages, printers, network shares, FTP locations, or destinations provided by custom components included with the solution.
- Retrieve and modify input data.
- Create and insert new data pages.
- Retrieve the number and description of the port used to submit the job.
- Retrieve the name of the formset associated with the job.
- Retrieve global solution settings.
- Start another merge within the current merge.

The following scripting elements are unique to forms merge scripts:

- **mergeContext top-level object**—This provides fields and methods for forms merge jobs.
- **DataPage object**—This is a page of input data.
- **FormSetManageClass object**—This is used to manage the formset, allowing you to add, delete, and update formsets through the methods specified in this class.
- **MergeClass object**—This is used to merge data with a formset.

The script file TestMergeScript.js in the TestMergeScript example template is an example of a forms merge script.

Scripting for different stages of a forms merge

Forms merge scripts use callbacks to define functions that are activated at various stages of a forms merge job. The **main()** function in the script contains any actions executed when the job is first submitted, as well as assignments of callback functions. You only need to define and assign callback functions for the stages where scripted actions are necessary.

Assign callback functions to the following fields of the **mergeContext** top-level object at the end of the **main()** function (or, when using exception handling, at the end of the **try** block within the function):

mergeContext field to which the callback function is assigned	Stage of forms merge at which the assigned function is called	Parameters of assigned callback function
mergeContext.renderDataPage	After each page of input data is read	**page**—DataPage object containing the data from the page
mergeContext.endDoc	After input from a single form is completed and the resulting PDF is rendered	**fileName**—String containing the path and file name of the output PDF
mergeContext.endDataSet	After input from a single form is completed and the resulting dataset is generated **Note:** A dataset is generated only if this callback function is defined.	**fileName**—String containing the path and file name of the dataset, which can be sent to a printer with a forms card
mergeContext.endData	After all input data is read	None
mergeContext.endJob	After all PDFs included in the job have been rendered	**files**—Array of strings containing the file names of all output PDFs

A forms merge script with all callback functions defined is structured as follows:

```
function main()
{
   try
   {
      //Actions to take when job is first submitted
      …
      //Assignment of callback functions
      mergeContext.renderDataPage = myRenderDataPageFunction;
      mergeContext.endDoc = myEndDocFunction;
      mergeContext.endDataSet = myEndDataSetFunction;
      mergeContext.endData = myEndDataFunction;
      mergeContext.endJob = myEndJobFunction;
   }
   catch(e)
   {
      //Logging and other exception handling
      …
      throw e;
   }
}

function myRenderDataPageFunction(page)
{
   try
   {
      //Actions to take after each page of data
      //is read from the input data
      …
   }
   catch(e)
   {
      //Logging and other exception handling
      …
      throw e;
   }
}
```

```
function myEndDocFunction(fileName)
{
   try
   {
      //Actions to take after input from a single form is completed
      //and the resulting PDF is rendered
      …
   }
   catch(e)
   {
      //Logging and other exception handling
      …
      throw e;
   }
}

function myEndDataSetFunction(fileName)
{
   try
   {
      //Actions to take after input from a single form is completed
      //and the resulting dataset is generated
      …
   }
   catch(e)
   {
      //Logging and other exception handling
      …
      throw e;
   }
}

function myEndDataFunction()
{
   try
   {
      //Actions to take after all input data is read
      …
   }
   catch(e)
   {
      //Logging and other exception handling
      …
      throw e;
   }
}

function myEndJobFunction(files)
{
   try
   {
      //Actions to take after all PDFs included
      //in the job have been rendered
      …
   }
   catch(e)
   {
      //Logging and other exception handling
      …
      throw e;
```

```
    }
}
```

Using the PrintClass service with forms merge scripts

As in all scripts, you can use the **PrintClass** service to send a document to a printer.

Two fields are particularly important when using **PrintClass** in a forms merge script:

- **nativeSpooling**—Normally, the destination printer is identified by its IP address, but input data for a forms merge may contain the name of the output queue. Set this field to **true**, to identify the printer by queue name instead of by IP address.
- **optionMode**—This field should always be set to **PrintClass.OPTION_MODE_IGNORE** to make sure print settings from the form are used instead of settings that may be defined using **PrintClass**.

Printing forms on printers with forms cards

If you have printers with forms cards, you can choose to print forms using a dataset, an XML list of key-value pairs that represent input data. Most of the information about the final output form is stored on the forms card, and only the dataset is sent to the printer. Because less data is transferred over the network, use of datasets may provide better performance with limited network bandwidth.

To use a dataset, define **mergeContext.endDataSet** in **main()**, and then use the function assigned to the field to send the dataset to the printer.

Using scheduled scripts

Scheduled scripts can be created to assist with system maintenance. Since scheduled scripts are launched by the LDD system itself rather than a printer or software client, they cannot use objects that require user intervention, such as prompt objects and scan methods.

You can use auto-configure methods for making changes to the LDD system in scheduled scripts if the **caller** object is assigned as follows:

```
var caller = context.getObject("autoconfigUtilities")
```

You can also access an Additional Options field that an administrator can populate with free-form text when scheduling the task in LMC. You should provide the LDD administrator with documentation on any values that the script expects in the field. Scripts access the value supplied by the administrator using the field **taskInfo.additionalOptions**.

To create a scheduled script, create a new script in the src\scripts\scheduled\ folder.

For more information about adding scheduled scripts in LMC, see the *Lexmark Document Distributor Administrator's Guide*.

Examples of scheduled scripts can be found in the TestMFP and TestSNS example templates.

Understanding the objects used in solution development

Most tasks in scripted solutions for the Lexmark Document Distributor are completed by creating and manipulating objects. The Solution Builder Toolkit includes three main types of objects specific to development of solutions for Lexmark Document Distributor: top-level objects, prompts, and services.

Top-level objects

Top-level objects provide global references to the entity that launched the script, including references to the printer, confirmation page, prompts and services, and task information.
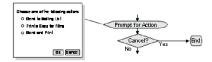
For example, the **taskInfo** object is used to access and set task information, such as the IP of the printer that originated the task or the status displayed with the job in LMC, and the **caller** object is used to execute a prompt on the printer.

```
function main()
{
  …
  // Use taskInfo to get the address of the originating printer
  var printerIP = taskInfo.printer;

  // Use taskInfo to set the task status in LMC
  taskInfo.status = "Running";
  …
  // Use the caller object to execute the prompt
  caller.ask(mystringprompt);
  …
}
```

Prompts

Prompts are used primarily during the document capture stage to receive inputs, including both documents and answers to prompts, from the caller (the printer or software client).

The following example uses a string prompt to illustrate the basic structure necessary to create, manipulate, and execute most prompts, although some prompts use a different structure. For more information and examples for specific prompts, see the *Lexmark Document Distributor Script Reference Guide*. Note that a separate function is used for the prompt object to enhance readability and reusability of code.

```
function main()
{
  …
  var value = promptForString()
  …
}
function promptForString()
{
  // Create instance of the StringPrompt object
  var myprompt = new StringPrompt;

  // Set text to display when the prompt is executed
  myprompt.text = "Enter a string";
```

```
    // Set the default value of the prompt
    myprompt.value = "sample response";

    // Execute the prompt
    caller.ask(myprompt);

    // Return the value of the prompt
    return myprompt.value;
}
```
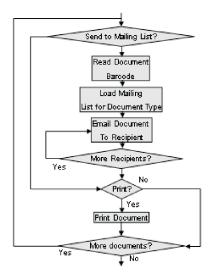
Notes:

- No prompts should be used when developing a script to be run on a schedule.
- Some prompts are not supported for single-function printers. For more information, see "Supported printers" on page 9.

Services

Services are used after document capture for processing and routing documents, as well as providing confirmation of the job to the user. Services may also be used during document capture for processing answers to prompts, such as checking passwords. However, you should avoid excessive processing between successive prompts to prevent unexpected delays for the user.

Use the following structure to create, manipulate, and execute a service:

```
// Create an instance of the service object "ServiceClass"
var myService = new ServiceClass();

// Set properties of the service object
myService.field1 = value1;
myService.field2 = value2;

// Execute the service
myService.execute();
```

Note: Services that require a user to scan a document should not be used when developing a script to be run on a schedule.

Configuring solutions

Managing solution settings

Solution settings can be accessed from scripts and are available to the LDD administrator through LMC during and after solution deployment. A solution setting is accessed from a script by name, just like a constant or variable.

Solution settings may be global or local. The following table lists the differences between global and local solution settings:

Differences between global and local solution settings

Setting type	Scope	Location in LMC	Time of first configuration	Common uses
Global	All device groups that use the solution	Configuration task on the Solutions tab	The solution is uploaded to LDD	• Global logging on/off • Mail server address • Database server address
Local	A single device group that uses the solution	Solutions task on the Device Groups tab; dialog during deployment to a device group	The solution is added to a device group	• Network share for a specific group (for example, one share for a group of printers in the Accounting Department, one for a group of printers in the Audit Department) • Scan settings • E-mail address of the manager associated with each group

Solution settings are generally configured throughout the solution development process as the need arises for each setting. To create solution settings, double-click **solutionSettings.ldd** in the src\conf\ folder of the Package Explorer list. The Solution Settings Editor appears in the Editor pane. Separate lists of local and global solution settings are shown.

To edit an existing setting, select an item in the Local Solution Settings list or Global Solution Settings list. To add a new setting, click **New** beside the associated list. To delete the current selection, click **Remove** beside the associated list. To change the position of the current selection in Lexmark Management Console, click **Up** or **Down** beside the associated list.

Modify the properties of the selected or new setting using the fields on the right side of the window. While editing properties, click **Clear** to revert to the properties last saved for the setting, or click **Save** to save the new properties.

Solutions setting properties and their descriptions

Property	Description
Key	This is the name used to access the property from a solution script
Name	This is the name used for the property in Lexmark Management Console
Read-Only (local solution settings only)	This determines whether the property is read-only. A read-only property cannot be modified by a script or by the user in Lexmark Management Console.
Type	This is the type assignment for the property. See the following table of property types for a description of each type.

Type assignments and their descriptions

Type	Displayed in LMC	Properties
Check	Check box	Values: • true • false
Content Type	List of predefined content type settings	• Text • Photo • Mixed
Text	Value field	Any character **Note:** The Value field can be left blank.
Number	Value field	Any character **Note:** The Value field should not be left blank, even if the minimum value is set to zero.
Password	Value field	Any character
Darkness	List of predefined darkness values	Values: • 0 • 1 • 2 • 3 • 4 • 5 • 6 • 7 • 8
Depth	List of predefined color depth settings	Values: • Black and White • Grayscale • Color
Duplex	List of predefined duplex settings	Values: • Simplex • Long Edge Bound • Short Edge Bound
File Type	List of predefined file type settings	Values: • TIFF • JPEG • PDF • PS

Type	Displayed in LMC	Properties
Media Size	List of predefined media-size settings	Values: • Letter • Legal • A4 • B5 • Executive • A5 • Business Card • Photo (3 x 5) • Photo (4 x 6) • Mixed
Resolution	List of predefined resolution settings	Values: • 150 • 200 • 300 • 400 • 600

Managing device policies

The device policy developed within the solution determines the profiles that are made available to a printer or software client when the solution is deployed. Each profile is associated with a script within the solution. The policy also manages the default profile buttons, shortcut number, access control number, scan settings, and eSF applications associated with each profile. The device policy is generally configured near the end of the solution development process, since existing scripts are assigned to profiles.

To manage the device policy associated with the solution, double-click **devicePolicy.ldd** in the src\conf\ folder of the project in the Package Explorer pane. The Device Policy Editor appears in the Editor pane.

To add a new profile, click **New**, type the key for the new profile, and then click **Create**.

To edit an existing profile, select an item in the Device Profiles list.

To delete a profile, select it in the Device Profiles list, and then click **Remove**.

A device policy contains a separate sub-policy for each device class and for software clients. Select a device class from the Device Group list to access the sub-policy for each, or select **Software** to access the sub-policy for software clients.

Notes:

- Each sub-policy includes unique settings for Name, Task, No Scan, Profile buttons, Shortcut Number, Access Control Number, and Settings. Values are shown for only the currently selected Device Group.
- Sub-policies for single-function printers are created using their respective device classes, but you must select **No Scan** to enable deploying a profile to single-function printers.
- Scan Settings, Profile buttons, Shortcut Number, and Access Control Number do not apply to software clients, so those settings are not available when Software is selected.

To reset all settings for a sub-policy, click **Reset** beside the Device Group list. While editing properties, click **Clear** to revert to the properties last saved for the profile, or **Save** to save the new properties.

Note: Changes in a sub-policy must be saved before selecting a different Device Group. If the sub-policy has been changed and you select a different Device Group, then you are asked whether to save changes to the current sub-policy.

The following table shows the properties available for each device profile:

Device profile properties and their descriptions

Property	Description
Key	This is the name used to access the profile from a script. The key applies to the policy as a whole and does not vary for sub-policies.
Device Group	This allows the solution developer to select which device subtypes are in the profile. The device group can be any of the following: • **e-Task**—This refers to devices without eSF support but are supported by LDD. • **e-Task 2**—This refers to all devices with eSF framework support. • **Optra Image**—This refer to MFPs that do not support eSF. • **Software**—This refers to LDD printer ports, Select'N'Send, hybrid eSF applications, and other software applications that submit jobs to an LDD System using the LDD Job Submission Web Service.
Name	This is the name used for the profile in Lexmark Management Console. **Note:** For a profile used with a Lexmark Document Server Port, the name must be 14 or fewer characters.
Task	This is the script associated with the policy.
No Scan (e-Task and e-Task 2)	This indicates whether a scan task is part of the solution. A profile can be deployed to a single-function printer only when No Scan is selected.
No Prompt	This is a control added to note that the profile does not contain prompting. This helps improve the performance of the LDD printer ports when run on print servers where prompting is not supported. This is active for device groups which are set to Software. Select this setting for any existing Software solutions, such as print release, to improve the LDD printer port performance for print servers.
Setting (e-Task and e-Task 2)	This is the setting type to add to or edit in the list of settings. See the following table of setting types for a description of each type and available values.
Mapped (e-Task and e-Task 2)	This determines whether the setting is mapped to a solution setting defined in solutionSettings.ldd.
Value (e-Task and e-Task 2)	This is the value of the setting to add to or edit in the list of settings. See the following table of setting types for the available values for each setting type.
Overrideable (e-Task and e-Task 2)	This determines whether the user at the printer can override the setting when the solution is run.
Shortcut Number	This is the The shortcut number by which a user can access the profile from the printer.
Access Control Number	This is the number used to assign access controls specifically to the profile, using one of the Solution 1–10 settings in the printer Embedded Web Server.

The following table shows the setting types available for device profiles:

Setting types and their available values

Type	Available values
Content Type	- Text - Photo - Mixed
Darkness	0 1 2 3 4 5 6 7 8
Depth	- Black and White - Grayscale - Color
Duplex	- Simplex - Long Edge Bound
File Type	- TIFF - JPEG - PDF - PS
Media Size	- Letter - Legal - A4 - B5 - Executive - A5 - Business Card - Photo (3 x 5) - Photo (4 x 6) - Mixed
Orientation	- Portrait - Landscape

Type	Available values
Resolution	150 200 300 400 600

Profile buttons

You can package profile buttons to appear on the home screen as part of the device policy for e‑Task and e‑Task 2 devices. When e‑Task or e‑Task 2 is selected in the Device Group list, the Profile Button(s) section appears. Additionally, when e‑Task 2 is selected, a selection appears for e‑Task 2 or e‑Task 2+ profile buttons, representing older and newer e‑Task 2 printers, respectively. You can determine which setting to use by matching the preview of the default image with the look of the existing buttons on the printer display.

You can load separate images for Up Image, shown when the button is in its default state, and Down Image, shown while the user is pressing the button. If no Down Image is specified, the Up Image is used for both conditions.

Note: File names of images used for the home screen cannot contain double-byte characters.

Images selected are resized to the following dimensions for each device class. For best results, resize or crop source images to the correct size before use.

- **e‑Task**—120 x 80 pixels
- **e‑Task 2 and e‑Task 2+, SFP e‑Task 2+**—120 x 75 pixels
- **e‑Task 3**—172 x 254 pixels
- **X642**—120 x 55 pixels

eSF applications

To associate an eSF application with the e‑Task 2 sub-policy for a hybrid solution, click **Import** beside the eSF Applications list, and then locate an eSF application. Select the newly imported application in the list, and then make sure **e‑Task2** is selected in the Device Group list. To remove a previously imported eSF application, select it from the list, and then click **Remove**.

Note: File names of eSF applications used in a solution cannot contain double-byte characters.

To manage the settings associated with the eSF application and allow later configuration of the application in LMC, import and configure the descriptor file for the eSF application.

Notes:

- LDD cannot accept colons in XML tag names, which appear in some descriptor files for eSF applications. If you upload a solution with a descriptor file containing colons in tag names, then the Solutions tab and the eSF Configuration task for device groups will no longer function, and intervention from Lexmark Professional Services will be required to restore access. Before importing the descriptor file, open it in a text editor and remove any colons from tag names. For example, if the tag `<esf:display pattern="instptrn">` appears in the file, then change it to `<esfdisplay pattern="instptrn">`. Make sure to change matching closing tags as well.

- LDD can only manage eSF application settings for e-Task 2+ printers. You must configure eSF application settings for e-Task 2 and X642 printers using the Embedded Web Server on each printer after the application is deployed.

1 Select the eSF application from the eSF Application list.

2 Click **Descriptor**.

3 Locate the XML descriptor file for the eSF application. The file name should be the same as the file name of the eSF application, with an ".xml" extension and "_desc" appended before the extension.

4 Click **Open**.

5 Select the eSF application from the eSF Application list.

6 Click the **eSF Descriptor Editor** tab at the bottom of the Device Policy Editor.

7 Modify the settings as necessary, and then click **Save**.

Managing the Solution Status Page

The Solution Status Page can optionally be used to provide simple and easy-to-use access to status information for the server system where the solution is running and the printers in the device groups to which the solution is deployed. The Solution Status Page is ideal for users with a basic setup who are not experienced with LMC. Additionally, new printers and licenses can be added, and a single Fix button can fix many common problems. The Solution Status Page is particularly suited to less experienced users.

Note: The Solution Status Page can be enabled only for solutions designed for device groups.

To manage the Status Page associated with the solution, double-click **statusPage.properties** in the src\conf\ folder of the project in the Package Explorer pane. The Status Page Editor appears in the Editor pane.

Click **Enable Status Page** to enable the Status Page for the solution and show the additional Status Page settings.

Two tabs are available at the bottom of the Status Page Editor to modify Status Page settings:

- **Status Page Editor**—This provides access to the following basic settings of the Status Page:
  - **Device Group Name**—This is the Device Group for which the Status Page is used.
  - **Background Image**—This is the background image of the Status Page.

- **Logo Image**—This is the logo image that appears beside the title of the Status Page.
- **Jobs Logo Image**—This is the logo image that appears in the jobs section of the Status Page.
- **Status Page Properties**—This provides access to all Status Page settings in the text-based configuration file. In addition to the previously mentioned settings, most titles and message strings used on the Status Page can be customized.

When a solution has been deployed with a Solution Status Page, the page can be accessed from your Web browser using the URL **http://*loadbalancer*:9780/lmc/statuspage/?solutionName=<solutionname>**, where *loadbalancer* is the computer where your load balancer and database are installed.

Managing formsets

You can use forms merge in a solution by including formsets created with Lexmark Forms Composer. Formsets included in a workflow solution project are uploaded to the LDD system when the workflow solution is installed.

Formsets are added as needed throughout the solution development process. To manage formsets, double-click **forms.ldd** in the src\conf\ folder of the Package Explorer list. The Forms List Editor appears in the Editor pane. The list of included formsets is shown.

To add a formset that will be installed with a workflow solution:

1 In the Forms List Editor, click **Import**.

2 Browse to a formset (.sdd or .fdd) file.

3 Click **Open**.

When uploaded, formsets may be shared among workflow solutions, and the administrator selects whether to remove associated formsets when removing solutions. To create a link with a formset included in another workflow solution:

1 In the Forms List Editor, click **Link**.

2 In the Form Name field, type the name of the formset.

3 Click **Create**.

To remove a formset from the project, select it from the Forms List, and then click **Remove**.

Managing custom reports

LDD uses JasperReports for custom reports, which can be included with a workflow solution during development. You can create custom reports using the open source application iReport 3.5.2. For more information about overall report design, see the documentation for iReport, and for specific information about developing custom reports for LDD, see the *Lexmark Document Distributor Administrator's Guide*.

Custom reports are added as needed throughout the solution development process. To manage custom reports, double-click **reports.ldd** in the src\conf\ folder of the Package Explorer list. The Reports List Editor appears in the Editor pane. The list of included reports is shown.

To add a report that will be installed with a workflow solution:

1 In the Reports List Editor, click **Import**.

2 Browse to a compiled JasperReports (.jasper) file.

3 Click **Open**.

To edit the settings of a report after it is imported:

1 Select the report file from the Reports list.

2 Type a descriptive report name.

3 Select an output format.

> **Note:** Some reports are designed for a particular output format. For more information about a custom report, contact the designer of your custom report.

4 Select **Database** from the Datasource drop-down menu.

5 Select **Monitor** from the Source Choice drop-down menu.

6 If you are using auto-configure to schedule the report, then select the period for the report to cover.

7 Add a custom parameter for either a query parameter defined in the custom report file:

a In the Key field, type the name of the parameter defined within the report.

b Select the parameter type to identify the type of data contained in the parameter.

c Type a default value for the parameter.

> **Notes:**
>
> - To add multiple custom parameters, save the report settings, and then enter the information for the next custom parameter.
> - To remove a custom parameter, select it from the list, and then click **Remove**.

8 Click **Save**.

Using the included document processing components

Bar code read support

The LDD SDK includes two bar code read packages: a premium Windows native package, and a lower-cost Java package. The following tables compare the details of each package:

Features and usage

	Premium package	Value package
LDD script objects	`BarcodeReadClass` `BarcodeConstant`	`BarcodeReadLiteClass` `BarcodeReadLiteConstant`
License fees	Required for each LDD server installation	Included in system cost
Code	Windows native (.NET or COM)	Java
Performance	Faster	Slower
Solution template project	TestBarcodeRead	TestBCRead
Ideal scan resolution	300 dpi	300 dpi
Expected quality	Excellent, Good, Fair, or Poor	Interval between scanned pixel rows, 1–100
Reading from a specified zone	Yes	No

	Premium package	Value package
Automatic detection of one-dimensional codes	Yes	No
Checksum validation	Yes	Yes
Fixed length	Yes	No
Minimum length	Yes	No
Page number	Yes	No
Coordinates	Yes	Yes
Multiple codes with directional sorting	Yes	Yes

One-dimensional symbology support

	Premium package	Value package
Codabar	Yes	Yes
Code 11	No	Yes
Code 25	Yes	No
Code 32	Yes	Yes
Code 39	Yes	Yes
Code 39 mod 43	Yes	No
Code 93	Yes	Yes
Code 128	Yes	Yes
EAN 8	Yes	Yes
EAN 8 + 2	Yes	Yes
EAN 8 + 5	Yes	Yes
EAN 13	Yes	Yes
EAN 13 + 2	Yes	Yes
EAN 13 + 5	Yes	Yes
GS1-128 (formerly UCC/EAN-128)	Yes **Note:** The GS-128 symbology is specified for the `type` field of `BarcodeReadClass` using the constant `BARCODE_UCC128`	No
GS1 DataBar (formerly RSS)	No	Yes **Note:** The GS1 DataBar symbology is specified for the `type` field of `BarcodeReadLiteClass` using the constant `BC_CODERSS14` or `BC_CODERSSLIMITED`.
ITF-14	Yes	No
Patch Code	Yes	Yes

	Premium package	Value package
PLANET	Yes	Yes
POSTNET	Yes	Yes
QR Code	No	Yes
RM4SCC	No	Yes
Telepen	No	Yes
UPC-A	Yes	Yes
UPC-E	Yes	Yes
USPS Intelligent Mail	Yes	No

Two-dimensional symbology support

	Premium package	Value package
Datamatrix	Yes	Yes
PDF417	Yes	Yes

Bar code write support

The LDD SDK includes two bar code write packages: a premium Windows native package, and an open source, Java-based Barbecue. The following tables compare the details of each package:

Features and usage

	Premium	Barbecue

LDD script objects	`BCWriteClass`
	`BCWriteClass.options`
	`BarcodeConstant`
		`ImagingClass.options.overlay.barcode`
		`BarcodeConstant`

License fees	Required for each LDD server installation	Open source; no fees
Code	Windows native (.NET or COM)	Java
Custom minimum width	No	Yes
Human-readable text position	Above, below, or embedded	Below only
Human-readable text justification	Controllable	Fixed

One-dimensional symbology support

	Premium	Barbecue
Codabar	Yes	Yes
Code 25	Yes	Yes

	Premium	Barbecue
Code 25 Interleaved	Yes	Yes
Code 39	Yes	Yes
Code 93	Yes	No
Code 128	Yes	Yes
Code 128A	Yes	Yes
Code 128B	Yes	Yes
Code 128C	Yes	Yes
EAN 8	Yes	No
EAN 8 + 2	Yes	No
EAN 8 + 5	Yes	No
EAN 13	Yes	Yes
EAN 13 + 2	Yes	No
EAN 13 + 5 (Bookland)	Yes	Yes
GS1-128 (formerly UCC/EAN-128) **Note:** The GS-128 symbology is specified for the `type` field using the constant `BARCODE_UCC128`	Yes	Yes
GS1-DataMatrix	Yes	Yes
ITF-14	Yes	No
POSTNET	Yes	Yes
QR Code	Yes	No
UPC-A	Yes	Yes
UPC-E	Yes	No
USPS Intelligent Mail	Yes	No

Two-dimensional symbology support

	Premium	Barbecue
PDF417	Yes	No

OCR support

Lexmark Document Distributor optionally includes an *optical character recognition* (OCR) module to retrieve text from scanned documents, enabling them for searching, editing, and indexing. Entire documents, specific pages of documents, or specific areas of pages can be stored as text documents.

The following table lists the features of the OCR module:

Feature	Details
Supported languages	• English • Danish • Dutch • Finnish • French • German • Italian • Norwegian • Polish • Portuguese • Russian • Spanish • Swedish
Dictionaries	Each language has one associated dictionary. The search order of language dictionaries can be configured in a script.
Supported text types	• Common typographic (serif, sans-serif, italic, monospace) • Typewriter-printed • Dot-matrix-printed • ZIP-code-style numerals • OCR-A • OCR-B • MICR (E-13B and CMC-7) • Gothic
Supported input text size	10 points–220 points
Default output fonts	The following selections are made for default output fonts based on the input font: • **Serif fonts**—Times New Roman • **Sans-serif fonts**—Arial • **Monospaced fonts**—Courier New Output fonts can be changed to any other TrueType font installed on the system within a script, after the OCR operation, and before the text is exported to a document.
Zoning	• **Automatic**—The entire page is scanned and analyzed for blocks of text. • **Manual**—The script defines regions on a page for OCR scanning. This method is faster, since it does not require analyzing the entire page.
Available output formats	• HTML • Searchable PDF • Plain text (TXT) • Rich Text Format (RTF)

Feature	Details
Document color	Supported for input: • Bitonal • Grayscale • Color Supported for output: • Bitonal • Color
Resolution	Input is accepted from documents scanned at 150 dpi–600 dpi. Performance is best with documents scanned at 300 dpi.
Image processing capabilities	The following image processing tasks are available: • Despeckle • Deskew • Rotation (90-degree increments) • Identification of text without output of text

Accuracy factors

The accuracy of the OCR module depends on the quality of the image scanned from the document, which is determined by the following factors:

- **Media type**—More-reflective specialty media may result in poor-quality scanned images.
- **Document condition**—Aged, wrinkled, or creased documents may result in poor-quality scanned images.
- **Document image quality**—Low resolution or color depth of the scanned image or poor print quality in the scanned document may result in poor-quality scanned images.
- **Document alignment**—Skewed or slightly rotated documents, such as pages fed through a misaligned *automatic document feeder* (ADF) may cause difficulty in reading the scanned image.

Using the included solution database

The LDD system includes a Firebird database that your solutions can use to store information instead of a custom database. This allows you to create and modify tables without first creating a custom database, and data in the included database is automatically migrated to a new version when the Firebird database installation used by LDD is upgraded.

The included database is SOLUTIONINFO.fdb, located in the \firebird\data\ folder where the LDD database is installed, along with the system databases.

The credentials for the database are as follows:

- **User name—`framework`**
- **Password—`rivet`**

Understanding the Job Submission Web Service

The LDD 4.x Job Submission Web Service allows any Web service-capable client software to interact with an LDD system. Select'N'Send and the Lexmark Document Server Port use this service, and eSF applications used in hybrid solutions can use it as well. For an example, see the TestHybrid example templates.

Through the Web service, clients can:

- Query the system for the profiles available to a client system based on the IP address of the client.
- Submit documents to the LDD system.
- Execute a profile to process documents.
- Query the system for task progress and status.

The following requirements must be met for the Web service to be available to a client:

- A software client license is installed for the client.
- The IP address of the client has been added to a software client group.
- The LDD system is online.

You can access the interface of the Job Sumbission Web Service at **http://loadbalancer:9780/lmc/services/JobSubmission?wsdl**, where **loadbalancer** is the computer where your load balancer is installed.

The following table lists the methods used with the Job Submission Web Service:

Method	Target	Description	Parameters	Return values
start	Load balancer	Initiate a job submission session	• **resolver**—The resolver used to determine the device group, solution, and task settings. The default resolver uses clientIP and profileName only. • **protocol**—The protocol used to extract prompt answers from the metadata. The default is **webdav**. • **authId**—The client user name • **clientIP**—The client IP address • **deviceGroup**—The device group associated with the job • **profileName**—The profile used for the job	• **sessionID**—The session ID, which must be used in later calls • **tomcatIP**—The address of the LDD server, which must be the target for later calls • **scanUrl**—The WebDAV folder where documents are submitted
post	WebDAV	Submit files in response to **ScanPrompt**	See the WebDAV documentation.	
metadata	LDD Server	Provide answers for other prompts	• **continue**—Indicates more metadata follows • **scan.x.file.y**—The path of a scanned file in the WebDAV repository. *x* indicates the sequence number of a scan prompt, and *y* indicates the sequence number of a file from that scan prompt. *x* and *y* are both zero-based.	Reserved

Understanding dynamic prompting support

When a profile is selected, solutions usually either prompt you for information or start a job. Many solutions involve submitting jobs with related information (such as account numbers, passwords, or processing options) that is obtained through prompting. Where possible, prompting should occur before submitting the job. This gives you the opportunity to cancel jobs when prompted for information they don't have at the moment.

The Job Submission Web Service provides prompting capability to Lexmark Document Server Printer Port clients. From the port monitor, the following prompts are supported:

- **MessagePrompt**
- **BooleanPrompt**
- **IntegerPrompt**
- **ListPrompt**
- **ArrayPrompt**
- **PasswordPrompt**
- **ScanPrompt**
- **MessagePrompt**
- **EndPrompt**

When the prompt wizard appears on the client screen, you can respond to the prompt within 30 seconds before it times out. Prompting depends on whether or not there are any more required information or documents to process. If there are more, then the end user is asked whether to continue or not. When the user reaches the last prompt, a summary dialog of the answers appears. The user can then choose to send or cancel the job.

You can cancel the job at any time, although cancelling the job cannot undo the job application processing that has already taken place.

Note: LDD 4.6.3.x printer ports on a clustered print server is not supported.

Using Kerberos authentication

If a user logs on at a printer using Kerberos, the credentials can be used by the LDD system to manipulate files on the network and interact with ECM systems on behalf of the user.

Notes:

- SSL is required to use Kerberos authentication with an LDD system.
- The date and time must be correct on the printer, LDD server, and KDC server when using Kerberos authentication.

The following objects use Kerberos authentication:

- FileClass
- LdapClass
- SharePointClass
- TextFileClass

Kerberos tickets are accessed as necessary, and no additional scripting is necessary.

Note: Credentials set for an object in a solution script override Kerberos credentials.

You can set a KDC address and realm within a script using the **credentials** top-level object:

```
credentials.add("kdc", "myhost.mycompany.com");
credentials.add("realm", "myrealm.mycompany.com");
```

Developing workflow solutions for previous versions of LDD

You can use the current version of the LDD SDK to develop workflow solutions for previous versions of LDD 4.x. However, auto-complete is installed in JSEclipse only for the objects in the latest version of LDD, so do not rely on auto-complete when developing solutions for previous versions. For information about objects in previous versions of LDD, see the *Lexmark Document Distributor Script Reference*.

Testing and deploying workflow solutions

Testing with the MFP emulator and performance simulator

The MFP emulator and performance simulator are used to test LDD solutions without a physical printer. The emulator interactively emulates an e-Task 2 printer control panel, and the performance simulator allows you to set parameters and quickly run multiple tests simulating either an e-Task or an e-Task 2 printer. The interactive emulator is useful for preliminary debugging, and the performance simulator is useful for comprehensive functional and stress testing.

Accessing the MFP emulator or performance simulator

- To access the interactive MFP emulator:

  In Eclipse, click **LDD SDK** > **MFP** > **Emulator (eTask2)**.

- To access the performance simulator:

  In Eclipse, click **LDD SDK** > **MFP** > **Performance Simulator**.

If you are running the MFP emulator or performance simulator for the first time, then the installation window appears:

1 If necessary, change the folder where to install the application.

   Note: The installation path cannot contain double-byte characters.

2 To launch the emulator or performance simulator after installation (depending on your initial selection) , select **Launch Emulator**.

3 Click **Finish**.

If you selected **Launch Emulator** or if the MFP emulator is already installed, then the interactive MFP Emulator or MFP Simulator configuration window appears.

Using the interactive MFP emulator

Using the interactive MFP emulator with an LDD system

1 From the MFP Emulator configuration window, click **Interactive Mode** > **MFP** > **Emulator (eTask2)**.

   The home screen window appears, and the emulator is accessible as a printer from LMC.

2 Make sure the LDD system is online.

3 Upload the solution to be tested in LMC. For more information about uploading a solution to the LDD system, see the *Lexmark Document Distributor Administrator's Guide*.

4 Add the MFP emulator to a device group in LMC, and then discover it.

   Note: The IP address of the emulator is the IP address of the computer where it is running. This address appears beside Client IP in the MFP Emulator configuration window, as well as in the upper-left corner of the home screen.

5 Deploy the solution and modify the home screen for the device group as necessary, and then perform a policy update.

6 If you included the profile on the home screen, then click the icon for the profile. If the profile does not appear on the home screen, then do the following:

   a Click **Held Jobs** > **Profiles**.

   b Click the icon for the profile.

   The profile launches the associated script on an LDD server.

   Note: Some prompts are not supported in interactive mode. When a script includes an unsupported prompt, a message appears on the emulated printer control panel. Click **Next** to continue the script after the prompt.

Simulating a scan task

1 Type or browse to the path of a TIFF, JPEG, PDF, or PostScript file to simulate the document to be scanned.

2 Click **OK**.

To assign a default image file to appear in each Scan File dialog, click **File** > **Properties**.

Saving print jobs

Print jobs initiated by a profile are discarded by default. To enable saving print jobs:

1 Make sure you have run the interactive emulator at least once. The configuration that contains the settings for the interactive emulator is created automatically the first time it is run.

2 Locate the \Profiles\interactive\conf\ folder where the MFP emulator is installed. The default is C:\Program Files \mfpsimulator\.

3 Open **sim-interactive.properties** in a text editor.

4 If necessary, modify the location where print jobs are saved beside `interactive.advanced.pj.output=`.

5 Change the value beside `interactive.advanced.pj.save=` to `true`.

6 If the interactive emulator is open, then close, and then restart it.

Using the performance simulator

Preparing and running tests in the performance simulator

1 From the MFP Simulator configuration window, click **File** > **New Configuration**.

2 Type the IP address or host name of the LDD system in the Load Balancer IP field.

3 Type the profile name to execute.

   Note: The profile name refers to a device profile created using the Device Policy Editor in the solution. A list of profiles can also be found in the Profiles task after the solution has been deployed to the relevant device group in LMC.

4 Select whether to simulate an e-Task 2 or e-Task device.

5 Discover the performance simulator and deploy the appropriate solution in LMC:

   Note: This step is only necessary if the interactive MFP emulator or performance simulator has not been discovered, or if the necessary solution has not been deployed.

    a To set the simulator to discovery mode, type **0** for both "Number of MFPs" and Repetitions fields.

    b Click ⊟ to save the test profile, and then click ▶ to start the simulator in discovery mode.

    c Make sure the LDD system is online.

    d Upload the solution to be tested in LMC.

    e Add the performance simulator to a device group in LMC, and then discover it.

       Note: The IP address of the simulator is the IP address of the computer where it is running. This address appears in the Client IP field in the MFP Simulator configuration window.

    f Deploy the solution and modify the home screen for the device group as necessary, and then perform a policy update.

    g Click 🔴 to stop the simulator.

6 Type the number of MFPs to simulate.

7 Type the number of repetitions for the test.

8 In the Scan File field, browse to a TIFF, JPEG, PDF or PostScript file to use in simulating a scan task.

9 If necessary, configure advanced settings, including any answers to prompts that should be different than the default. For more information, see "Configuring advanced properties" on page 52.

10 To create a log during the test in Log4J, select **Enable UI Logging**.

11 Click ⊟ to save the test profile, and then click ▶ to start testing.

    You can stop a test that is still in progress by clicking 🔴.

Configuring advanced properties

Several advanced properties for the performance simulator, including custom prompt answers, are found on the Advanced tab of the MFP Simulator configuration window. Some properties also appear as fields on the Configuration tab. The selection of **E-Task2** or **E-Task** on the Configuration tab determines whether the Advanced (e-Task 2) or Basic (e-Task) properties are used.

To save the test configuration after modifying advanced properties, click ⊟.

Simulator properties

Property	Description	Default
serverAddress	The IP address or host name of the LDD system	None
profileName	The profile to run on the LDD system **Note:** The profile name refers to a Device Profile created using the Device Policy Editor in the solution. A list of profiles can also be found in the **Profiles** task for the relevant device group in LMC.	None
cancelProbability	The probability that the profile will be canceled, expressed as a decimal between **0** and **1**. In repetitive testing and testing on multiple printers, the profile is canceled for the specified percentage of the tests, with canceled tests randomly selected. When the application determines that a particular test will be canceled, a random prompt is selected within that test for the point of cancellation. The setting **0** specifies that no tests are canceled, and the setting **1** indicates that every test is canceled at a random prompt.	**0.0**

Property	Description	Default
ui.logging	Determines whether the test is logged in Log4J	**`false`**

Basic (e-Task) prompting properties

Property	Description	Default
basic.addressRange	The IP addresses used for emulated e-Task printers. A single IP may be used to emulate multiple e-Task printers at a single address, since the emulator can use multiple HTTP connections for e-Task. Multiple addresses are specified as a range, in the format **`xxx.xxx.xxx.xxx-xxx.xxx.xxx.xxx`**, and each included address must be bound to a network adapter in the local computer. If multiple addresses are specified, then only the first is used unless **`basic.multiIP`** is set to **`true`**.	Local IP address (set autotmatically when the simulator is started)
basic.scanfiles	The TIFF, JPEG, PDF, or PostScript files to use in simulating the scan task. The setting can contain a comma-delimited list of multiple files, which are submitted together for the scan task. **Note:** The delimiter used in the list can be changed using the **`scanFileDelimiter`** property.	None
basic.promptAnswers	A comma-delimited list of answers to supply for prompts asked by the profile. If left blank, the default response is used for all prompts. If you need to supply an answer for any prompt, then you must supply all answers for the applicable logic path. For more information, see "Supplying answers to prompts" on page 59. **Note:** The delimiter used in the list can be changed using the **`delimiter`** property.	None
basic.repetitions	The number of repetitions for the test on each emulated printer. Use **`0`** for both this property and **`basic.nummfps`** to enter discovery mode.	0
basic.nummfps	The number of printers to emulate for the test. Use **`0`** for both this property and **`basic.repetitions`** to enter discovery mode. **Note:** It is not recommended to emulate more than 250 printers.	0
basic.bind	Determines whether to bind the local IP address to the print listener for receiving print jobs	**`true`**
basic.prompting	Indicates to the application whether the profile contains prompts	**`true`**
basic.scanning	Indicates to the application whether the profile contains a scan task	**`true`**
basic.profilerunTimeThreshold	The time in milliseconds allowed for a profile to run before a warning message is logged	**`30000`**
basic.timeToFirstPromptThreshold	The time in milliseconds allowed for the first prompt in the profile to display before a warning message is logged	**`2000`**

Property	Description	Default
basic.multiIP	Determines whether multiple IP addresses are used for emulating multiple e-Task printers. If `false`, then only the first address specified for `basic.addressRange` is used. If `true`, then the number of addresses specified for `basic.addressRange` must match the number specified for `basic.nummfps`.	`true` (automatically changed to `false` if the test is run without specifying multiple addresses)
basic.readTimeout	The timeout in milliseconds for reading data from the LDD system	`360000`
basic.connectionTimeout	The timeout in milliseconds for connection requests to the LDD system	`180000`
native	This property should always be `false` for LDD 4.x.	`false`
basic.useRandomFileFromDirectory	Determines whether a random file is used from the folder specified in `basic.randomFileDirectoryPath` for simulating the scan task. When set, these properties override files specified for `basic.scanfiles`.	`false`
basic.randomFileDirectoryPath	Specifies the folder where image files for scans can be found when `basic.useRandomFileFromDirectory` is set to `true`	None

Advanced (e-Task 2) prompting properties

Property	Description	Default
advanced.promptAnswers	A comma-delimited list of answers to supply for prompts asked by the profile. If left blank, the default response is used for all prompts. If you need to supply an answer for any prompt, then you must supply all answers for the applicable logic path. For more information, see "Supplying answers to prompts" on page 59. **Note:** The delimiter used in the list can be changed using the `delimiter` property.	None
advanced.addressRange	The IP addresses used for emulated e-Task 2 printers. A single IP may be used to emulate multiple e-Task 2 printers at a single address, since the emulator can use multiple HTTP connections for e-Task 2. Multiple addresses are specified as a range, in the format *xxx.xxx.xxx.xxx-xxx.xxx.xxx.xxx*, and each included address must be bound to a network adapter in the local computer. If multiple addresses are specified, then only the first is used unless `advanced.multiIP` is set to `true`.	Local IP address (set autotmatically when the simulator is started)
advanced.repetitions	The number of repetitions for the test on each emulated printer. Use `0` for both this property and `advanced.nummfps` to enter discovery mode.	0

Property	Description	Default
advanced.nummfps	The number of printers to emulate for the test. Use **0** for both this property and **advanced.repetitions** to enter discovery mode. **Note:** It is not recommended to emulate more than 250 printers.	0
advanced.multiIP	Determines whether multiple IP addresses are used for emulating multiple e-Task 2 printers. If **false**, then only the first address specified for **advanced.addressRange** is used.	**true** (automatically changed to **false** if the test is run without specifying multiple addresses)
advanced.profilerunTimeThreshold	The time in milliseconds allowed for a profile to run before a warning message is logged	**30000**
advanced.timeToFirstPromptThreshold	The time in milliseconds allowed for the first prompt in the profile to display before a warning message is logged	**2000**
advanced.useSecureWebdav	Determines whether WebDAV communication with the LDD system should be secure. This property should be **true** when the LDD system is v4.4.0.2 or later, or **false** when the LDD system is v4.4.0.1 or earlier.	**true**
advanced.webdavUsername	The user name used for secure WebDAV communication with the LDD system. In most cases, this property should not be changed.	**ldd**
advanced.webdavPassword	The password used for secure WebDAV communication with the LDD system. In most cases, this property should not be changed.	**ldd**
advanced.useRandomFileFromDirectory	Determines whether a random file is used from the folder specified in **advanced.randomFileDirectoryPath** for simulating scan tasks. When set, these properties override files specified for **advanced.scanfiles***N*.	**false**
advanced.randomFileDirectoryPath	Specifies the folder where image files for scans can be found when **advanced.useRandomFileFromDirectory** is set to **true**	None
advanced.scanfiles1– advanced.scanfiles*N*	The TIFF, JPEG, PDF, or PostScript files to use in simulating scan tasks. Each property represents a single scan task, so properties after **advanced.scanfiles1** are only used for profiles that contain multiple scan tasks. Each property can contain a comma-delimited list of multiple files, which are submitted together for the scan task. **Note:** The delimiter used in the list can be changed using the **scanFileDelimiter** property.	None

Basic (e-Task) prompting scan properties

Property	Description	Default
basic.linfo.name	The profile name associated with the scan task. The default, which refers to the profile that is run for the test, should usually remain set.	**${*CurrentTestProfile*.profileName}** (This refers to the **profileName** property in the Simulator Properties table.)
basic.linfo.resolution	Resolution for the scan task	**300**
basic.linfo.format	Image format for the scan task	**TIFF**
basic.linfo.depth	Bit depth for the scan task	**8**
basic.linfo.orientation	Orientation for the scan task	**PORTRAIT**
basic.linfo.papersize	Paper size for the scan task	**LETTER**
basic.linfo.numpages	Number of pages for the scan task	**1**

Advanced (e-Task 2) prompting scan properties

Property	Description	Default
advanced.linfo.name	The profile name associated with the scan task. The default, which refers to the profile that is run for the test, should usually remain set.	**${*CurrentTestProfile*.profileName}** (This refers to the **profileName** property in the Simulator Properties table.)
advanced.linfo.resolution	Resolution for the scan task	**300**
advanced.linfo.format	Image format for the scan task	**TIFF**
advanced.linfo.depth	Bit depth for the scan task	**8**
advanced.linfo.orientation	Orientation for the scan task	**PORTRAIT**
advanced.linfo.papersize	Paper size for the scan task	**LETTER**
advanced.linfo.numpages	Number of pages for the scan task	**1**

Basic (e-Task) prompting print job properties

Property	Description	Default
basic.pj.addressRange	The address range to receive print jobs from the LDD system. The default, which refers to the address range set for the overall test, should usually remain set.	**${*CurrentTestProfile*.basic.addressRange}** (This refers to the **basic.addressRange** property in the Basic prompting properties table.)
basic.pj.output	The folder in which simulated print jobs should be saved	The **/Profiles/*CurrentTestProfile*/conf/data/PrintJobs** folder where the MFP emulator and performance simulator are installed
basic.pj.ext	The file extension of saved print jobs. Do not include a period (**.**) before the extension. The extension implies the file type used. One of the following: **pdf**, **ps**, **tif**.	**ps**

Property	Description	Default
basic.pj.save	Determines whether to save print jobs from the LDD system	**false**
basic.pj.poolSize	The size of the thread pool to use for print jobs. The default, which refers to the overall server pool size, should usually remain set.	**${CurrentTestProfile.serverPoolSize}**

Advanced (e-Task 2) prompting print job properties

Property	Description	Default
advanced.pj.addressRange	The address range to receive print jobs from the LDD system. The default, which refers to the address range set for the overall test, should usually remain set.	**${CurrentTestProfile.advanced.addressRange}** (This refers to the **advanced.addressRange** property in the Basic prompting properties table.)
advanced.pj.output	The folder where simulated print jobs should be saved	The **/Profiles/CurrentTestProfile/conf/data/PrintJobs** folder where the MFP emulator and performance simulator are installed
advanced.pj.ext	The file extension of saved print jobs. Do not include a period (**.**) before the extension. The extension implies the file type used. One of the following: **pdf**, **ps**, **tif**.	**ps**
advanced.pj.save	Determines whether to save print jobs from the LDD system	**false**
advanced.pj.poolSize	The size of the thread pool to use for print jobs. The default, which refers to the overall server pool size, should usually remain set.	**${CurrentTestProfile.serverPoolSize}**

Delay properties

Property	Description	Default
clientStartUpDelay	The delay, in milliseconds, between starting each group of emulated MFPs when testing with more than one MFP	**500**
clientStartUpDelaySize	The number of MFPs to start after each interval specified by **clientStartUpDelay**	**10**
startDelayMin[*]	The minimum delay between test repetitions	**2000**
* The delay properties are useful in simulating real-world delays where user input is expected when stress-testing a solution. For each delay specified, a random value is selected between the minimum and maximum values.		

Property	Description	Default
startDelayMax[*]	The maximum delay between test repetitions	`2000`
promptDelayMin[*]	The minimum delay before answering prompts	`2000`
promptDelayMax[*]	The maximum delay before answering prompts	`2000`
initScanDelayMin[*]	The minimum delay before submitting a simulated scan	`2000`
initScanDelayMax[*]	The maximum delay before submitting a simulated scan	`2000`
betweenScanDelayMin[*]	The minimum delay between submitting multiple files in a simulated scan task	`2000`
betweenScanDelayMax[*]	The maximum delay between submitting multiple files in a simulated scan task	`2000`
* The delay properties are useful in simulating real-world delays where user input is expected when stress-testing a solution. For each delay specified, a random value is selected between the minimum and maximum values.		

Prompt answer formats and advanced emulator properties

Property	Description	Default
delimiter	The delimiter used between subsequent prompt answers in `basic.promptAnswers` and `advanced.promptAnswers` **Note:** A colon (`:`) cannot be used as the delimiter.	`,`
scanFileDelimiter	The delimiter used between multiple scan files in `basic.scanfiles` and `advanced.scanfilesN`	`,`
defaultAnswer	The string used in `basic.promptAnswers` and `advanced.promptAnswers` to indicate the default prompt answer	`[DEFAULT]`
cancelAnswer	The string used in `basic.promptAnswers` and `advanced.promptAnswers` to indicate canceling the prompt	`[CANCEL]`
randomAnswer	The string used in `basic.promptAnswers` and `advanced.promptAnswers` to indicate that a random answer should be selected	`[RANDOM]`
serverPoolSize	The maximum number of threads in server thread pools	`50`
JMXHTTPAdaptorPort	The HTTP port for an Adaptor used for JMX-based remote management	`8090`

Basic (e-Task) scheduled task properties

Property	Description	Default
basic.pauseCronExp	A CRON expression that schedules a pause in the test	None
basic.unpauseCronExp	A CRON expression that schedules the test to resume after a pause has been scheduled	None
basic.addMfpCronExp	A CRON expression that determines the interval at which a new printer is added to the test	None
basic.removeMfpCronExp	A CRON expression that determines the interval at which a printer is removed from the test	None
basic.numScheduledMfpsToAdd	The number of printers to add at the interval specified by `basic.addMfpCronExp`	1

Property	Description	Default
basic.numScheduledMfpsToRemove	The number of printers to remove at the interval specified by `basic.removeMfpCronExp`	1

Advanced (e-Task 2) scheduled task properties

Property	Description	Default
advanced.pauseCronExp	A CRON expression that schedules a pause in the test	None
advanced.unpauseCronExp	A CRON expression that schedules the test to resume after a pause has been scheduled	None
advanced.addMfpCronExp	A CRON expression that determines the interval at which a new printer is added to the test	None
advanced.removeMfpCronExp	A CRON expression that determines the interval at which a printer is removed from the test	None
advanced.numScheduledMfpsToAdd	The number of printers to add at the interval specified by `advanced.addMfpCronExp`	1
advanced.numScheduledMfpsToRemove	The number of printers to remove at the interval specified by `advanced.removeMfpCronExp`	1

Supplying answers to prompts

You can supply a comma-delimited list of answers to supply for prompts asked by the profile in the setting `basic.promptAnswers` (for e-Task printers) or `advanced.promptAnswers` (for e-Task 2 printers). If the setting is left blank, then the default response is used for all prompts. The delimiter for the list may be changed using the `delimiter` setting.

If you need to supply an answer for any prompt, then you must supply all answers for the applicable logic path. To specify the default answer for a prompt in the path, use `[DEFAULT]`, or the answer otherwise specified by the `defaultAnswer` setting. The logic path may be different depending on prompt answers, so you must plan answers for the specific path you want to take through the prompts. It may be helpful to test the path by first using the interactive MFP emulator.

The following table shows the valid answer values for each prompt type:

Prompt type	Valid answer values	Default value if no default is specified by the script
Array	Zero-based array index	0

Authentication (magnetic stripe card or RFID data)	A value, separated by a colon from a colon-delimited list of key=value pairs that simulate data from a magnetic stripe card or RFID device, using the following standard keys:
	
	FormatCode
	Name
	Track1
	Track1Raw
	Track1Pan
	Track1AdditionalData
	Track2
	Track2Raw
	Track2Pan
	Track2AdditionalData
	Track3
	Track3Raw
	Track3Pan
	Track3AdditionalData
	
	For example:
	
	`4444555566667777:Track2Raw=;4444555566667`
	`777=09051010000041600000?:Track1Raw=%B444`
	`45555566667777^USER/JOEQ^09051010000000000`
	`00000000000000000416000000?:FormatCode=B`
	`:Track1AdditionalData=09051010000000000000`
	`00000000000000000416000000:Track1Pan=44445`
	`55566667777Track2AdditionalData=090510100`
	`00041600000:Name=USER/JOE Q`
	
	Note: Line breaks may be included in Authentication values. However, line breaks in the example are included only for clarity.
		Empty string

Boolean	**true** **false**	**true**
Copy	**[DEFAULT]** only	N/A
CopyUI	**[DEFAULT]** only	N/A
Custom VLML	**[DEFAULT]** only	N/A
Email	**[DEFAULT]** only	N/A
EmailUI	**[DEFAULT]** only	N/A
Fax	**[DEFAULT]** only	N/A
FaxUI	**[DEFAULT]** only	N/A
Image boolean	**true** **false**	**true**

Prompt type	Valid answer values	Default value if no default is specified by the script
Image list	Zero-based array index	0
Image message	`[DEFAULT]` only	N/A
Integer	Numeric integer	0
List	Zero-based array index	0
Message	`[DEFAULT]` only	N/A
Numeric	Numeric integer	0
Password	Text string	Empty string
Scan	None; scan prompts are handled by the `basic.scanfiles` and `advanced.scanfilesN` settings. Answers for scan prompts should not be included in the sequence of prompt answers.	N/A
ScanUI	`[DEFAULT]` only	N/A
String	Text string	Empty string

Using JConsole to monitor and modify a running test

You can use the *Java Monitoring and Management Console* (JConsole) or another JMX-enabled application to access attributes and operations of the performance simulator process during a test. The following steps detail accessing these attributes and operations using JConsole specifically, but the listed attributes and operations are the same for other JMX-enabled applications.

1 Run JConsole.

Note: JConsole is installed with the Java SE Development Kit. The default location for JConsole is C:\Program Files\Java\jdk<*current version*>\bin\jconsole.exe.

2 While a performance simulator test is running, select **com.lexmark.workflow.simulator.App** from the list of processes on the Local tab.

Note: If a test is started after the "Connect to Agent" dialog is opened, then click the empty area within the list of processes to refresh it.

3 Click **Connect** > **MBeans** tab.

4 Expand the simulator folder, and then expand the folder for the currently running test profile.

5 For e-Task 2, expand the Advanced folder.

or

For e-Task, expand the Basic folder.

6 Select **Simulation**.

From the Attributes tab, you can see the following details of a running test:

- **ActiveMfps**—This is the number of MFPs currently being emulated for the test.
- **BetweenClientStartUpDelaySize**—This is the number of MFPs started after each interval specified by the `clientStartUpDelay` setting in the test profile.

- **Cancels**—This is the number of tests canceled, which is controlled by the `cancelProbability` setting in the test profile.
- **Failures**—This is the number of tests run that did not complete successfully.
- **Name**—This is the name of the test, which includes the test profile name; Advanced for e-Task 2 or Basic for e-Task.
- **PausedMfps**—This is the number of paused MFPs.
- **RunCount**—This is the total number of completed tests.
- **StartTime**—This is the date and time when the test was started.
- **Successes**—This is the number of successfully completed tests.

Only the BetweenClientStartUpDelaySize value can be changed from the Attributes tab.

From the Operations tab, you can perform any of the following actions by clicking the corresponding button:

- **getBetweenClientStartUpDelaySize**—Retrieve the current setting for the number of MFPs started after each interval specified by the `clientStartUpDelay` setting in the test profile.
- **setBetweenClientStartUpDelaySize**—Set the number of MFPs started after each interval specified by the `clientStartUpDelay` setting in the test profile.
- **getActiveMfps**—Retrieve the number of MFPs currently being emulated for the test.
- **getRunCount**—Retrieve the total number of completed tests.
- **getCancels**—Retrieve the number of tests canceled.
- **getSuccesses**—Retrieve the number of successfully completed tests.
- **getFailures**—Retrieve the number of tests run that did not complete successfully.
- **pause**—Pause the test.
- **getPausedMfps**—Retrieve the number of paused MFPs.
- **addMfps**—Add the number of MFPs specified for p1 to the test.
- **removeMfps**—Remove the number of MFPs specified for p1 from the test.
- **shutdown**—Stop the test.
- **getName**—Retrieve the name of the test.
- **resume**—Resume a paused test.
- **getStartTime**—Retrieve the date and time when the test was started.

Determining the single-server throughput for a solution

When building or upgrading an LDD system around a particular solution, the single-server throughput of the solution should be determined to help in sizing the system. You can determine this value by testing the solution with the performance simulator.

For more information about system sizing using the value determined by this process, see the *Lexmark Document Distributor Administrator's Guide*.

Note: This test should be performed either on a separate test LDD system with at least one server matching the performance of your production system, or during a time that your production system is not processing any other jobs.

1 On the LDD system where the solution is being tested, set all but one server offline.

   Note: If unequal servers are in the system, then you may need to test the solution on each server for the most accuracy.

2 In Eclipse, click **LDD SDK** > **MFP** > **Performance Simulator**.

   If you have not installed the MFP emulator and performance simulator, then follow the instructions on the computer screen.

3 From the MFP Simulator configuration window, click **File** > **New Configuration**.

4 Configure the simulator and LDD system for the test. Make sure you have discovered the simulator in the LDD system and have deployed the solution to the simulator.

   After the MFP simulator has been discovered, use the following settings in the MFP Simulator configuration window:

   - Configuration tab:

      – **Number of MFPs to simulate**—1

      – **Repetitions**—A number high enough to run at least an hour. The following typical throughputs on a server with the recommended hardware may help determine a rough estimate:

Solution processing load	Functions used	Average single-server throughput
Typical	• Some image processing • Printing	6000–8000 jobs per hour
Heavy	• Extensive image processing • Bar codes • External processes • Small to medium Document Producer (e-forms) jobs	2000–3000 jobs per hour
Very heavy (OCR)	• OCR • Large Document Producer (e-forms) jobs	100–200 jobs per hour

   Note: Using less than the recommended RAM significantly reduces throughput. For example, a dual-processor server with only 2GB of RAM can process only 600–800 jobs per hour when using a "heavy" solution.

- **Scan File**—If a scan task is part of the profile, then a TIFF, JPEG, PDF, or PostScript file is required to simulate the task.

  Note: If different files must be used for separate scan tasks for an e-Task 2 solution, then use the advanced property `advanced.scanfilesN` instead.

- Advanced tab:

  - **basic.promptAnswers/advanced.promptAnswers**—This is the list of answers to prompts that results in the logic path with the heaviest possible processing load. This setting may be omitted if the default answer to each prompt results in the logic path with the heaviest possible processing load.

  Note: You can change any other properties that help simulate your system more accurately.

5 Click ![save icon] to save the test profile, and then click ![start icon] to start testing.

Let the test to run for an hour.

Deploying a solution directly to an LDD server system

Notes:

- Solutions can only be deployed directly from Eclipse when using LDD 4.3 or later.
- Proxy settings may need to be updated in Eclipse for communication with the LDD server system. If a proxy server is in use and configured in Eclipse, and the LDD system is inside the proxy, then the host name of the load balancer must be added to the "No Proxy for" list in the Network Connections preferences.
- If a solution performs several actions using an auto-configure script, then you may need to increase the value of the Solution Export Wait Time setting in the Lexmark preferences to allow enough time for deployment.

1 Select the solution you want in the Package Explorer pane.

2 If Build Automatically is not enabled on the Project menu, then click **Project** > **Build Project**.

3 Click **File** > **Export**.

4 Expand the Lexmark folder, and then select **Deploy to LDD 4.3+ Server**.

5 Click **Next**.

6 If the server has not been accessed from Eclipse before, then do the following:

a Select **Deploy to new LDD System**.

b Type either the host name or IP address of the load balancer.

c Type the user name and password used to log in to LMC.

Note: The Password field cannot accept double-byte characters. To enter a password with double-byte characters, type it in a text editor, copy it, and then paste it into the Password field.

d Click **Add**.

7 Select **Deploy to existing LDD System**.

8 Select the server from the list.

9 Click **Finish**.

Restarting the Lexmark Solutions Application Server

If you install a workflow solution that includes a component, then you may need to restart the Lexmark Solutions Application Server for the solution to fully function.

Before restarting the Lexmark Solutions Application Server, set the server offline on the System tab in LMC. Make sure the server is offline before proceeding. Click **Refresh**, and then make sure `offline` is reported in the Status column for the server.

You can restart the Lexmark Solutions Application Server from the Windows Services control panel.

Note: When you restart the Lexmark Solutions Application Server service, any solution-related file in the \Lexmark \Solutions\apps\wf-ldss\ or \Lexmark\Solutions\apps\wf-ldss\solutions folders, such as a property file for a solution, is reverted to the version stored with the solution package as it was initially installed or upgraded, and any manual changes are lost.

Distributing a solution file and installing the solution using LMC

When the development system does not have access to the LDD server system, you can distribute the solution file and install the solution using LMC.

Note: The following procedure applies to LDD 4.3 or later. For information about manually installing a solution on an LDD 4.2 system, see the documentation for LDD 4.2.

1 If Build Automatically is not enabled on the Project menu, then select the solution in the Package Explorer pane, and then click **Project** > **Build Project**.

2 Distribute and install the solution file:

a Open LMC.

b Click the **Solutions** tab.

c Select **All Solutions** from the Solutions list.

d Click **Install/Upgrade**.

e In the window that appears, type a path to a solution file, or click **Browse** to browse for the solution file.

Note: For general distribution, the solution file is located in the \target\install folder within the main folder of the solution project. The solution file has an extension of .solution.

f Click **Upload**.

Managing the LDD 4.x System List

To access the LDD 4.x System List window, click **LDD SDK** > **LDD 4.x System List**.

From the System List window, you can:

- Add a new server system:

1 Click **New**.

2 Type either the host name or IP Address of the load balancer.

3 If necessary, change the port used to access LMC.

4 Type the user name and password used to log on to LMC.

Note: The Password field cannot accept double-byte characters. To enter a password with double-byte characters, type it in a text editor, copy it, and then paste it into the Password field.

5 If necessary, select the release (LDD version) of the targeted server system.

6 Click **Add**.

If authentication with the server system is successful, then the host name or IP address appears in the list.

- Edit settings for an existing system:

  1 Select a server system from the list.

  2 Edit the connection and authentication settings as necessary.

  3 Click **Update**.

- Remove an existing system:

  1 Select a server system from the list.

  2 Click **Remove**.

- Quickly access LMC for an existing system:

  1 Select a server system from the list.

  2 Click **LMC**.

  The management console of the selected system appears in the Eclipse Web browser.

Note: Proxy settings may need to be updated in Eclipse for communication with an LDD server system. If a proxy server is in use and configured in Eclipse, and an LDD system is inside the proxy, then the host name of the load balancer must be added to the "No Proxy for" list in the Network Connections preferences.

Building a workflow solution from the command line

1 Create a working folder.

Example: **C:\solutionfolder**

2 Copy the following files, located in the Eclipse \plugins folder, to the new folder:
- com.lexmark.lddsdk.core_1.0.0.*timestamp*.jar
- com.lexmark.lddsdk.sbtcore_1.0.0.*timestamp*.jar
- com.lexmark.lddsdk.sbt4*x*_1.0.0.*timestamp*.jar

timestamp represents the timestamp that appears on the latest version of each file, and *x* represents the target version of LDD.

3 Copy the Rhino JavaScript compiler, js-1.6R1.jar, to the new folder.

4 Add the working folder to the classpath.

Example: **java -classpath C:\solutionfolder**

5 Remove the *timestamp* from the file names of com.lexmark.lddsdk.core_1.0.0.*timestamp*.jar and com.lexmark.lddsdk.sbtcore_1.0.0.*timestamp*.jar, so that the new file names are as follows:
- com.lexmark.lddsdk.core_1.0.0.jar
- com.lexmark.lddsdk.sbtcore_1.0.0.jar

6 From the working folder, execute this command, noting the replacements that follow:

```
java -jar com.lexmark.lddsdk.sbt4x_1.0.0.timestamp.jar project_container
working_folder_path/js-1.6R1.jar
```

 Note: Multiple lines are shown for clarity. Type the entire command on a single line.

Make the following replacements in the command:

- *timestamp*—The timestamp contained in the file name

  Example: `com.lexmark.lddsdk.sbt44_1.0.0.v20081027-1303.jar`

- *x*—The version number of the target version of LDD

  Example: `com.lexmark.lddsdk.sbt44_1.0.0.v20081027-1303.jar`

- *project_container*—The full path to the container folder of the project in the workspace

  Example: `C:/workspace/TestMFP`

- `working_folder_path`—The full path of the working folder you created in step 1

Command example: `java -jar com.lexmark.lddsdk.sbt44_1.0.0.v20081027-1303.jar C:/workspace/TestMFP C:/solutionfolder/js-1.6R1.jar`

After a successful build, a new solution file can be found in the \target\install folder within the project container folder. The file extension of the solution file is .solution.

Developing components

Understanding component design

A typical component contains four classes:

- **Service interface**—This defines the contracts for the service implementation class and serves as a property type for the bean implementation class.
- **Service implementation**—This implements service interface class.
- **Bean interface**—This sets properties for the bean implementation class.
- **Bean implementation**—This implements the bean interface and calls the methods of the service implementation class.

Best practices for component design

- Implement a standard JavaScript component interface:
  - Implement the **new** operator to create instances of the component.
  - Use uppercase letters for constants.
  - Define all constants as children of the component class.
  - Implement the **setInput** method, and accept an array where appropriate.
  - Implement the **result** field, and return an array where appropriate.
- Each method is automatically logged to the confirmation page when called. Use **com.lexmark.workflow.framework.annotation.ConfirmBeanMethodLoggingOverride** to hide methods or arguments that should not appear in the confirmation page, such as passwords:
  - To prevent a method from appearing at all on the confirmation page, add **@ConfirmBeanMethodLoggingOverride(hide=true)** before the method declaration.
  - To prevent only the arguments of a method from appearing on the confirmation page, add **@ConfirmBeanMethodLoggingOverride(hideArguments=true)** before the method declaration. The arguments are replaced with the text **<hidden-args>** on the confirmation page.
- Log all activity using the Apache log4j framework, using the following levels:
  - **ERROR**—Fatal errors, such as system failures
  - **WARN**—Non-fatal errors, such as script exceptions
  - **INFO**—Diagnostic information, such as progress or status
  - **DEBUG**—Debugging information
- Handle script errors by throwing exceptions. Avoid catching exceptions within the component.
- Use **com.lexmark.workflow.framework.service.temporaryFile.TemporaryFileService** for output files and temporary files.
- Add a new bean, **xxxVersionBean**, in applicationContext.xml to show the version number of the component in LMC.

Creating a new component project

Like solutions, each LDD component is maintained as a project within Eclipse.

1 In Eclipse, click **File** > **New** > **Project**.

2 Expand the Lexmark folder.

3 Select **LDD 4.x Component**, and then click **Next**.

4 Type a container name for the project. The container name is the name of the component project in Eclipse IDE.

5 Configure optional settings:

- To use a component name different from the container, clear the **Use Default** check box , and then type a component name in the Component Name field.

- To use a base Java package name different from the default, clear the **Use Default** check box, and then type a name for the base Java package in the Component Name field.

- To start a component project at a version other than 1.0, type a value in the Initial Version field.

- To use a package name different from the default that is based on the solution name, clear the **Use Default** check box, and then type a package name.

6 Select the version of the LDD system where to install the solution, and then click **Next**.

7 Select the template most appropriate for the component you plan to develop from the Available Templates list.

8 Click **Next**.

9 Type a description for the solution and the name of the author, and then click **Finish**.

The Lexmark Solution Development perspective is opened if another perspective is open before the new project is created.

Understanding the contents of a component project

The following folder structure details the contents of a component project. Some folders may not appear in all components.

ProjectFolder—This is the container folder, named when creating the project, that contains all contents of the project.

docs—This contains documentation files for the component.

lib—This contains third-party .jar, .exe, and .dll files used by the component.

src—This contains the source files of the project.

conf—This contains the configuration files for the project

images—This contains images associated with the component.

java—This contains Java source files.

native—This contains any non-Java source files.

platform—This maps to the target\component\platform folder, which contains the .jar file built from the component project.

prop—This contains properties files.

test—This contains source files for unit and integration tests.

web\WEB-INF—This contains applicationContext*.xml class configuration files for Spring Framework.

> **Note:** To be recognized by Spring Framework, class configuration file names must begin with `applicationContext`. The default class configuration file is named `applicationContext-ContainerName.xml`.

target—This contains the compiled component after a project build, in addition to associated class files, XML descriptor files, and copies of script files from the time of the build. This folder only appears in a new project after the first build.

> **Note:** This folder may be deleted to ensure a clean build.

component—This contains the XML descriptor of the component project.

platform—This contains the .jar file built from the component project.

install—This contains the compiled component solution, with the extension `.solution`.

Note: File and folder names within a component project cannot contain double-byte characters. However, files themselves may contain double-byte characters.

Including a component in a workflow solution project

1 Make sure the component project has been built. If Build Automatically is not enabled on the Project menu, then do the following:

a Select the component project in Package Explorer.

b Click **Project** > **Build Project**.

The src\platform folder should contain a .jar file after a successful build.

2 Determine whether to include or reference the component:

- An included component does not update with changes made to the original component project. Do the following to include a component:

  a Make sure the workflow solution project appears in Package Explorer.

  b Click and drag the .jar file from the src\platform folder of the component project to the root folder of the workflow solution project.

- A referenced component updates if the original component project is changed and rebuilt. Do the following to reference a component:

  a Right-click the workflow solution project folder in the Package Explorer pane, and then click **Properties**.

  b Select **Project References** from the list.

  c Select the check box beside the component project you want to reference in the workflow solution project.

  > **Note:** A project must appear in Package Explorer to appear in the Project References list.

  d Click **OK**.

Troubleshooting

Network connection problems occur when installing or updating plug-ins in Eclipse

If you connect to the Internet through a proxy, then make sure the proxy connection is set up correctly in Eclipse. For more information, see"Installing the development environment" on page 11.

The Lexmark Solution Development perspective or other features are missing

Make sure that Java SE 6 is installed:

1 From the Windows Control Panel, double-click **Java**.

2 On the General tab, click **About**.

3 In the About Java window, make sure that the version number is at least 6.

4 If an older version is installed, then install the Java SE 6 Development Kit (JDK) and Java Runtime Environment (JRE), available from **java.sun.com**

Auto-complete does not work or items are missing in auto-complete lists for LDD objects

Try one or more of the following:

- Make sure JSEclipse is installed properly.
- JSEclipse requires a workspace folder name with no spaces. Make sure your workspace folder name does not have spaces:

  1 Click **File** > **Switch Workspaces** > **Other**.

  2 In the Workspace field, type a path with no spaces, or click **Browse** and then select a folder that results in a path with no spaces.

  3 To copy your current workbench layout and working sets, expand **Copy Settings** and select the options.

  4 Click **OK**.

  Eclipse restarts and uses the new workspace.

  5 Click **LDD SDK** > **LDD Update JSEclipse Autocomplete**.

  6 When prompted, click **Yes** to restart Eclipse.

- Make sure the auto-complete libraries for JSEclipse have been updated for LDD:

  1 In Eclipse, click **LDD SDK** > **LDD Update JSEclipse Autocomplete**.

  Note: The menu item will be unavailable if JSEclipse is not installed.

  2 When prompted, click **Yes** to restart Eclipse.

A properties file updated using revision control does not update

If a properties file is updated by revision control software outside Eclipse, changes in the file may not appear in the associated editor in Eclipse.

To refresh the settings in a properties file in Eclipse, restart Eclipse.

LDD system times out when directly exporting a solution

Try one or more of the following:

- If a proxy server is in use and configured in Eclipse, and the LDD system is inside the proxy, then make sure the host name of the load balancer has been added to the "No Proxy for" list in the Network Connections preferences.
- If a solution performs several actions using an auto-configure script or the network is slow, then increase the timeout for exporting a solution to an LDD system:

  1 Click **Window** > **Preferences**.

  2 In the category list, select **Lexmark**.

  3 In the Solution Export Wait Time field, type a higher value.

The MFP emulator does not run

Occasionally, a Java process associated with the MFP emulator may continue to run after the MFP Emulator window is closed, which prevents a new session from running correctly.

Restart the MFP emulator:

1 Make sure the MFP Emulator window is closed.

2 Right-click the taskbar, and then click **Task Manager**.

3 Click the **Processes** tab.

4 If java.exe appears in the list of processes, then do the following:

  a Select **java.exe**.

  b Click **End Process** > **Yes**.

5 If javaw.exe appears in the list of processes, then do the following:

  a Select **javaw.exe**.

  b Click **End Process** > **Yes**.

6 Reopen the MFP Emulator window.

The MFP emulator runs but cannot be discovered in LMC

The SNMP Windows service in Windows Server 2003 may cause a conflict with the MFP emulator. If the SNMP service is running, then the MFP emulator appears to run normally, but it cannot be discovered in LMC.

1 Close the MFP emulator.

2 Disable the SNMP service in the Services control panel.

3 Restart the MFP emulator, and then reattempt to discover the emulator in LMC.

The Backspace and left arrow keys do not work when viewing LMC in Eclipse

When using LMC from the Web browser in Eclipse, the Backspace and left arrow keys may stop working in text boxes after the Eclipse tab focus is changed.

You can restore the function of the Backspace and left arrow keys by opening and closing a dialog:

1 Click **Help** > **About Eclipse Platform** > **OK**.

2 Return to the Lexmark Management Console tab, and then continue editing.

Appendix

Prompts supported by single-function printers

Single-function printers do not support all prompts supported by multifunction printers. Lists of supported prompts are included in the table below.

	Touch screen printers	Non-touch screen printers
Supported prompts	• ArrayPrompt • AuthenticationPrompt[1] • BooleanPrompt • CustomVlmlPrompt • ImageBooleanPrompt • ImageListPrompt • ImageMessagePrompt • IntegerPrompt • ListPrompt • MessagePrompt • NumericPrompt • PasswordPrompt • StringPrompt • NullPrompt	• ArrayPrompt • AuthenticationPrompt[1, 2] • BooleanPrompt • IntegerPrompt • ListPrompt • MessagePrompt • NumericPrompt • PasswordPrompt[3] • StringPrompt[2] • NullPrompt[4]

[1] Requires a supported card reader.

[2] Supported by T654 and W850 models only.

[3] Supports only numeric PINs in e-Task printers. E-Task printers include C520, C522, C524, C530, C532, C534, C732, C734, C736, C780, C782, C920, C935, E450, E460, E642, T640, T642, T644, T650, T652, W840.

[4] Supported by e-Task printers only.

Double-byte character support

Not all printer models support double-byte characters. If your printer is not listed in the table below, it does not support double-byte characters.

Printer model	Simplified Chinese	Traditional Chinese	Japanese	Korean
C748	X	X	X	X
C792	X	X	X	X
C925	X	X	X	X
C950	X	X	X	X
CS510	X	X	X	X
CX410	X	X	X	X

Printer model	Simplified Chinese	Traditional Chinese	Japanese	Korean
CX510	X	X	X	X
MS610	X	X	X	X
MS810, MS812	X	X	X	X
MX410, MX510, MX511	X	X	X	X
MX610, MX611	X	X	X	X
MX710, MX711	X	X	X	X
MX810, MX811, MX812	X	X	X	X
X463, X464, X466	X	X		X
X548	X	X	X	X
X642	X			
X644, X646	X			X
X651, X652, X654, X656, X658	X	X		X
6500	X	X	X	X
X734, X736, X738	X	X		X
X746, X748	X	X	X	X
X782	X			X
X792	X	X	X	X
X850, X852, X854	X		X	X
X860, X862, X864	X	X		X
X925	X	X	X	X
X940, X945	X		X	X
X950, X952, X954	X	X	X	X

Sample script for an export event

```
Public Function fnJSAPIProfileCall(ByVal profileName As String,
pWorkdoc As SCBCdrPROJLib.SCBCdrWorkdoc)
    Dim SOAPResponse, XML

    SOAPResponse = fnJSAPIStart(profileName, pWorkdoc)

    ' Parse START response
    Set XML = CreateObject("Microsoft.XMLDOM")
    XML.setProperty "SelectionLanguage", "XPath"
    XML.async = False
    XML.loadXML(SOAPResponse)

    Dim names, values
    Set names = XML.selectNodes("//name")
    Set values = XML.selectNodes("//value")

    Dim key, sessionID, scanUrl, tomcatIP, webdavUser, webdavPasswd
```

```
    Dim idx
    For idx=0 To names.length-1
       key = names(idx).Text

       If key = "sessionID" Then
          sessionID = values(idx).Text
       ElseIf key = "tomcatIP" Then
          tomcatIP = values(idx).Text
       ElseIf key = "scanUrl" Then
          scanUrl = values(idx).Text
       ElseIf key = "webdavUser" Then
          webdavUser = values(idx).Text
       ElseIf key = "webdavPasswd" Then
          webdavPasswd = values(idx).Text
       End If
    Next

    ' Optionally put the original tiff to the correct webdav folder
    ' location for processing by the script being run.
    Dim doWebDavPut As Boolean
    doWebDavPut = True ' hardcoded True for this example
    If doWebDavPut Then
       Dim http, fNameWithoutExt, fName, fileObject, fileBytes
       ' Original tiff file
       fNameWithoutExt = Left(pWorkdoc.Filename, CStr(Len(pWorkdoc.Filename) - 3))
       fName = fNameWithoutExt & "tif"

       ' Load tif bytes
       Set fileObject = CreateObject("ADODB.Stream")
       fileObject.type = 1
       fileObject.Open
       fileObject.LoadFromFile fName

       fileBytes = fileObject.Read

       ' webdav put bytes
       Set http = CreateObject("MSXML2.XMLHTTP.3.0")
       http.Open "PUT", scanUrl & "/scan.0.file.0.tif", False, webdavUser, webdavPasswd
       http.setRequestHeader "translate", "f" ' Set this to prevent stream problems
       http.Send fileBytes ' Send the stream across
    End If

    fnJSAPIMetadata(sessionID, scanUrl, tomcatIP)
End Function
```

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