

LexEVS back end installation instructions

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Introduction

This document is a subsection of the [Installation Guide](#).

This subsection provides installation instructions for the LexEVS back end. For installation requirements and troubleshooting, see [Installing LexEVS with its LexGrid Model/DB \(back end\)](#).

Preliminary considerations



BEFORE YOU BEGIN

LexEVS has been tested with the operating systems and hardware specified earlier in this guide. While LexEVS is expected to run on many variations of hardware and software similar to the test platforms, results cannot be guaranteed.

LexBIG Object Model

To describe LexEVS, the LexEVS service, CodeNodeGraph and CodeNodeSet interfaces are included. The model, as shown in Figure 2, contains the core query service from the `org.LexBIG.LexBIGService` domain package. The full and most recent version of the object model is described and illustrated as part of the JavaDocs.



Figure 2- LexBIGService Model

NOTE:



Figure 2 is a UML class diagram. For more information about UML, see the [Programmer's Guide](#)
For more information on the LexEVS architecture see the [Design and Architecture Guide](#)

After successfully installing LexEVS and running the verification test suite, as described in this guide, you should be ready to start programming using the API to meet the needs of application needs. If you have the required software installed on your system (see the previous section), then installing and running the test should not take more than 60 minutes.

Downloading and using the LexEVS local runtime Install Wizard



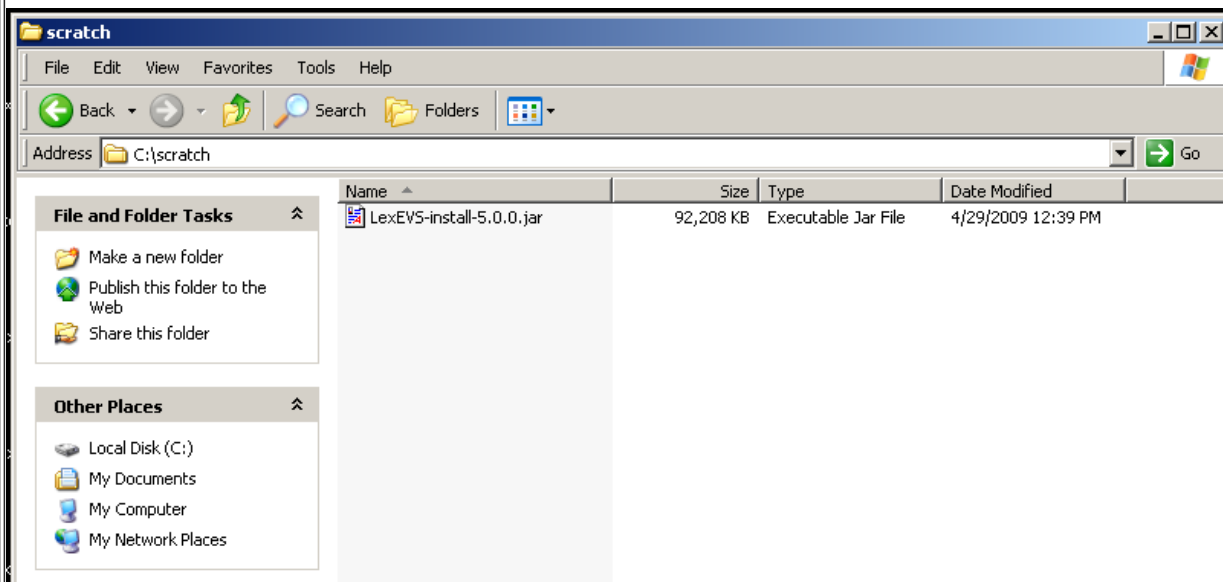
To best understand the installation and testing procedures for LexEVS, it is recommended that you follow the procedures described in this section with minimal deviation.

SUGGESTION

Complete the following steps to download LexEVS.

Note that the screenshots are provided as examples for clarification. Your version numbers on filenames may be different.

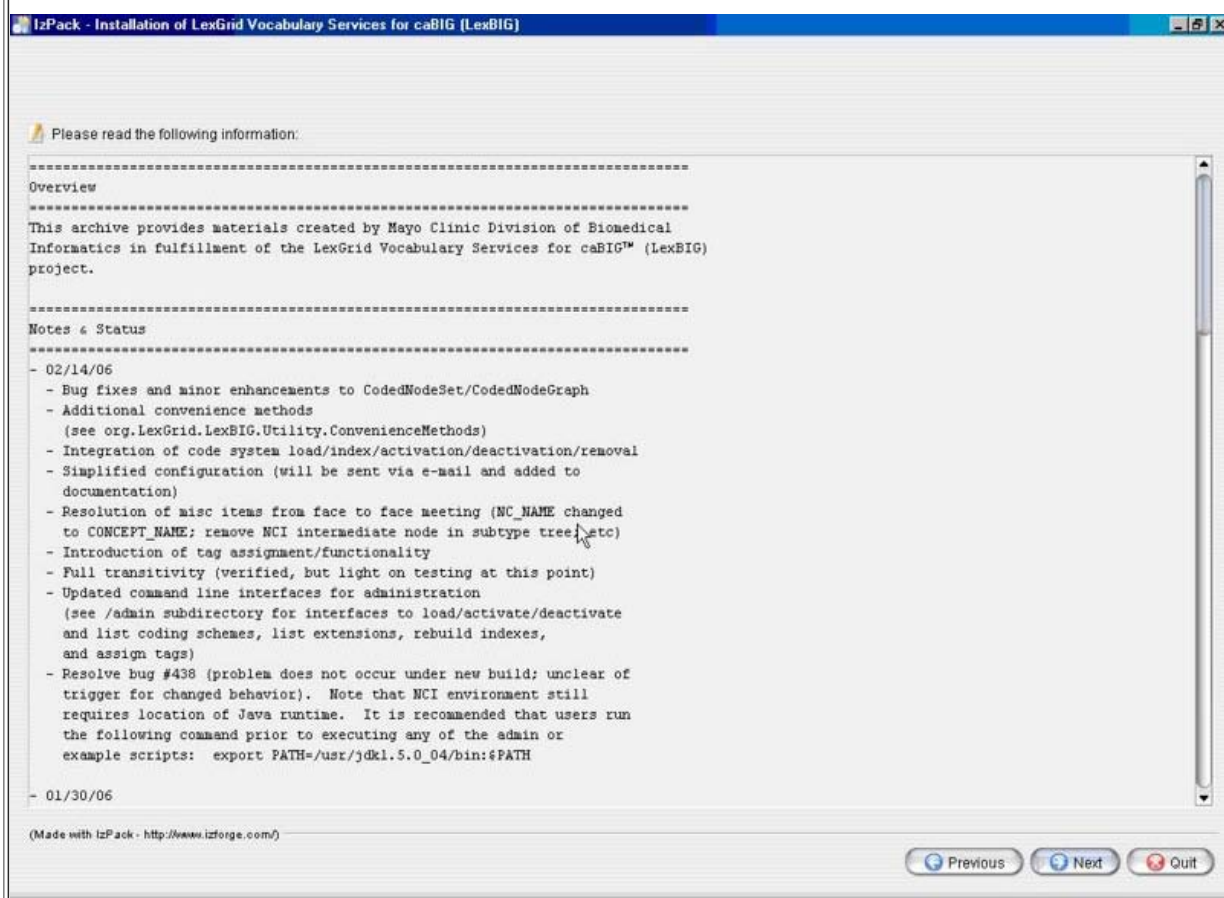
Step	Action
1	Download the LexEVS local runtime install package from one of these locations: LexEVS v5.0 at [https://gforge.nci.nih.gov/docman/view.php/491/17562/LexEVS_50_localRuntimeAndGUI_installer.jar] LexEVS v5.1 at [https://gforge.nci.nih.gov/docman/view.php/491/20159/LexEVS-install-5.1.jar]
2	Select the most recent version of the LexEVS Software Package LexEVSxx-install.jar. Save this file to your computer. This location will be referred to as the SAVE_DIRECTORY. You may have to disable pop-up blockers to allow save the install package to your local computer.
3	Using the Microsoft Windows File Explorer, navigate to the SAVE_DIRECTORY. Double Click on the LexEVSxx-install.jar file. This will launch the install wizard with a typical java installation. As an alternative to the File Explorer, using the Microsoft Windows Environment Command Prompt, change directory to the SAVE_DIRECTORY of the LexEVS software package you saved in step 2. At the command prompt, enter the following command to begin the installation wizard. Enter java -jar LexEVSxx-install.jar





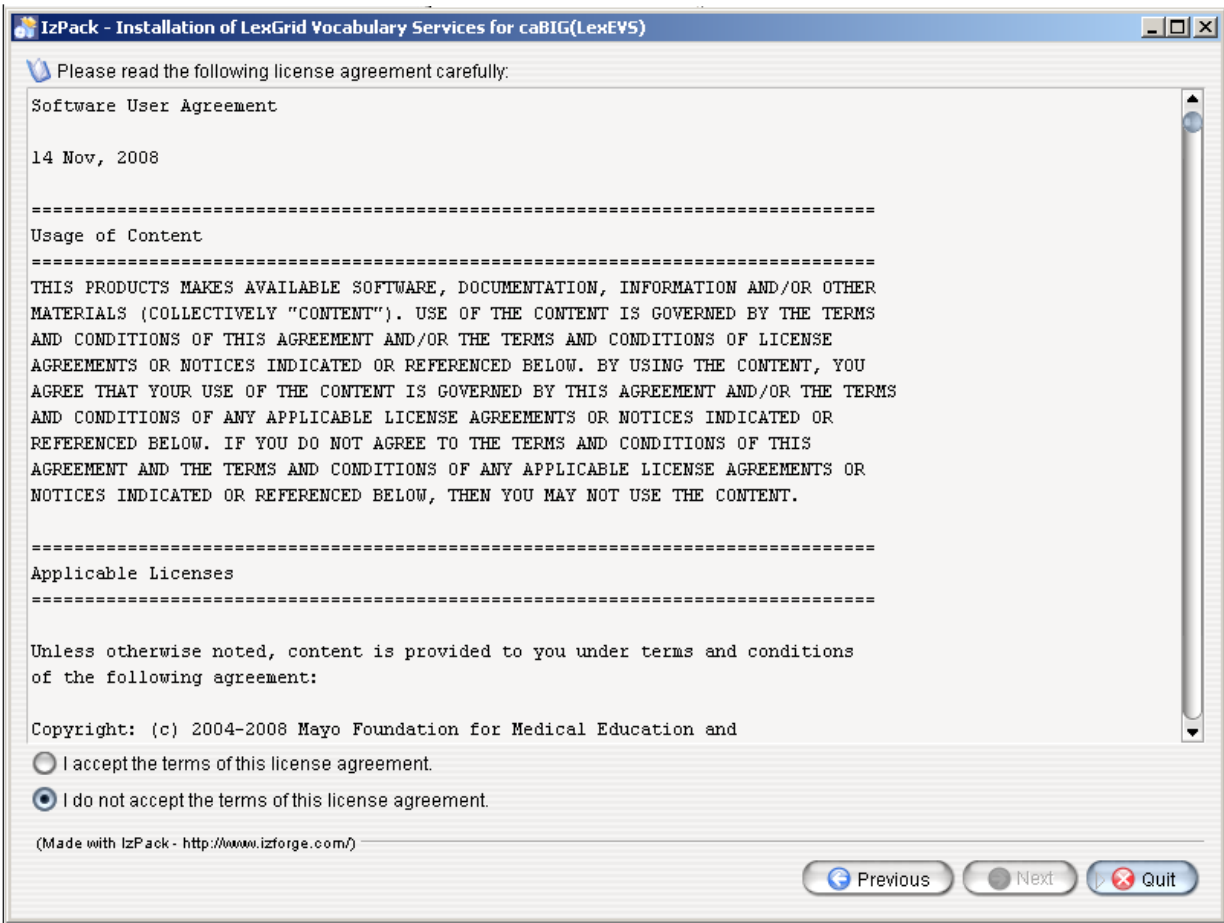
Click OK button to begin the installation. Note: The only language currently supported is English.

After the initial welcome screen, the release notes for the LexEVS distribution are displayed. Once you have read through the release notes, click the Next button to continue.



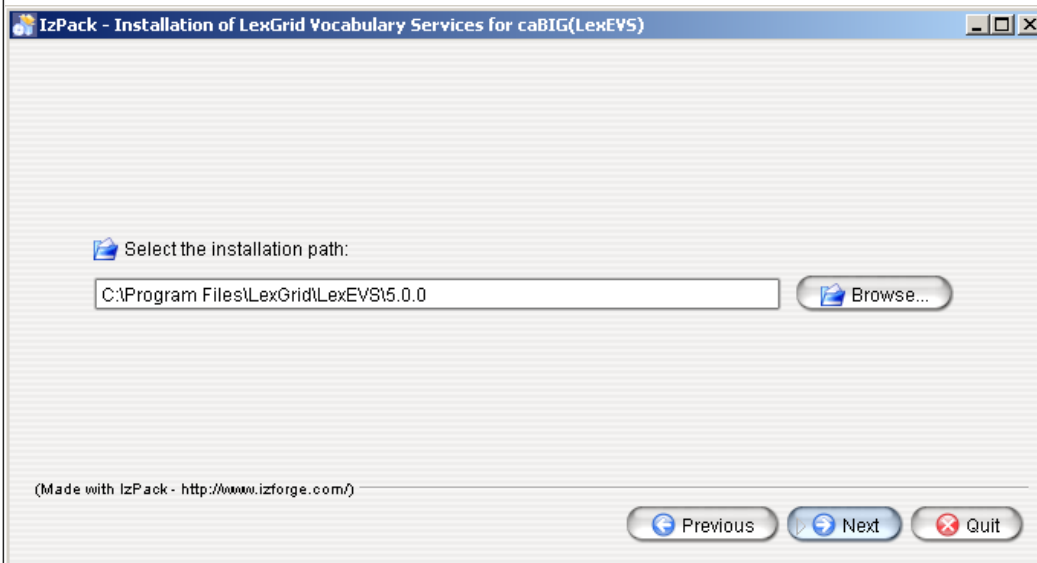
The next step is to review the license agreement of the LexEVS software and accept the terms of the agreement. Click Next button to continue with installation.

5



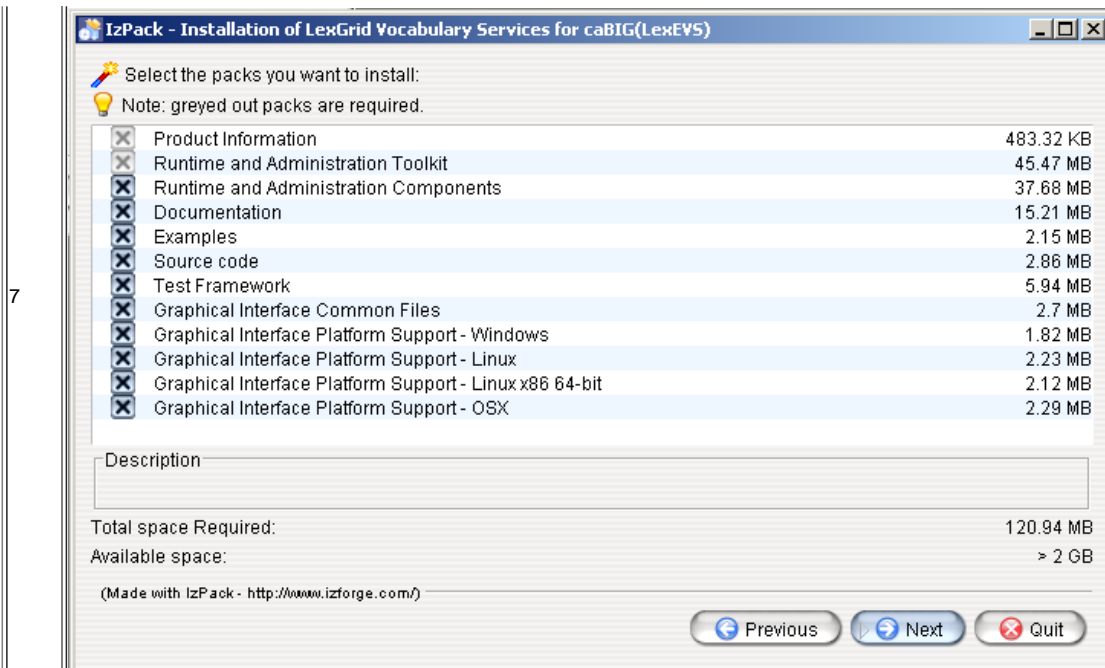
6

Enter the path where you would like the LexEVS software installed. Click the Next button to continue installation. This will be referred to as the LEXEVS_DIRECTORY throughout the remaining instructions.

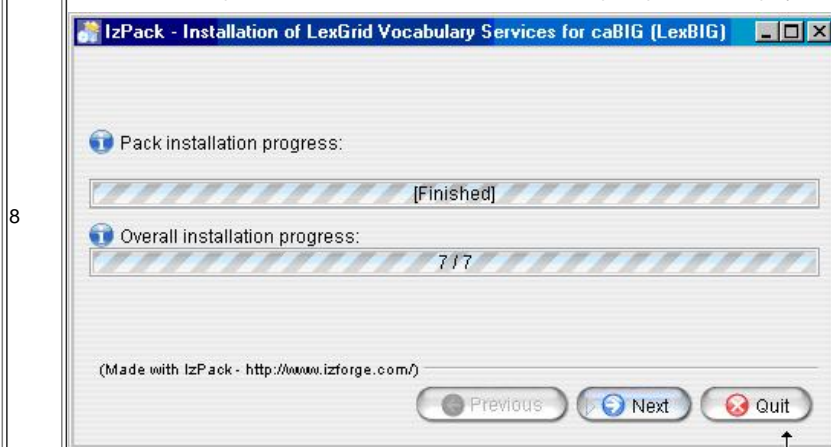


Note: If the directory does not exist, the program will prompt to proceed with creating the new directory. If the directory does exist, the program will prompt to overwrite the directory and files in the installation path.

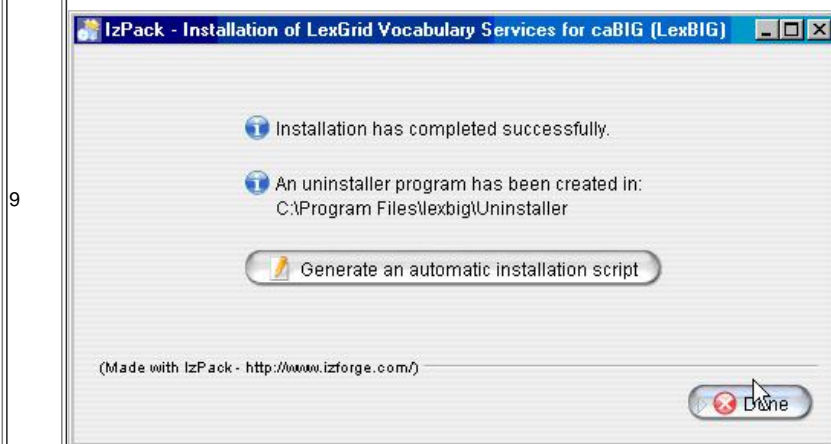
Select the components to be installed for LexEVS. Two of the components--LexEVS Runtime and Admin Toolkit, and LexEVS Info--are required and cannot be unchecked. The remaining components are optional. Once components have been selected, click the Next button to continue with installation.



Once all the components have been installed, a "Finished" prompt will be displayed. Click the Next button to continue installation.



The last step of the installation wizard provides the ability to generate an automatic installation script that can be used on other machines. This installation script can be used to install LexBIG without graphic wizard. Click Done to complete the installation process.



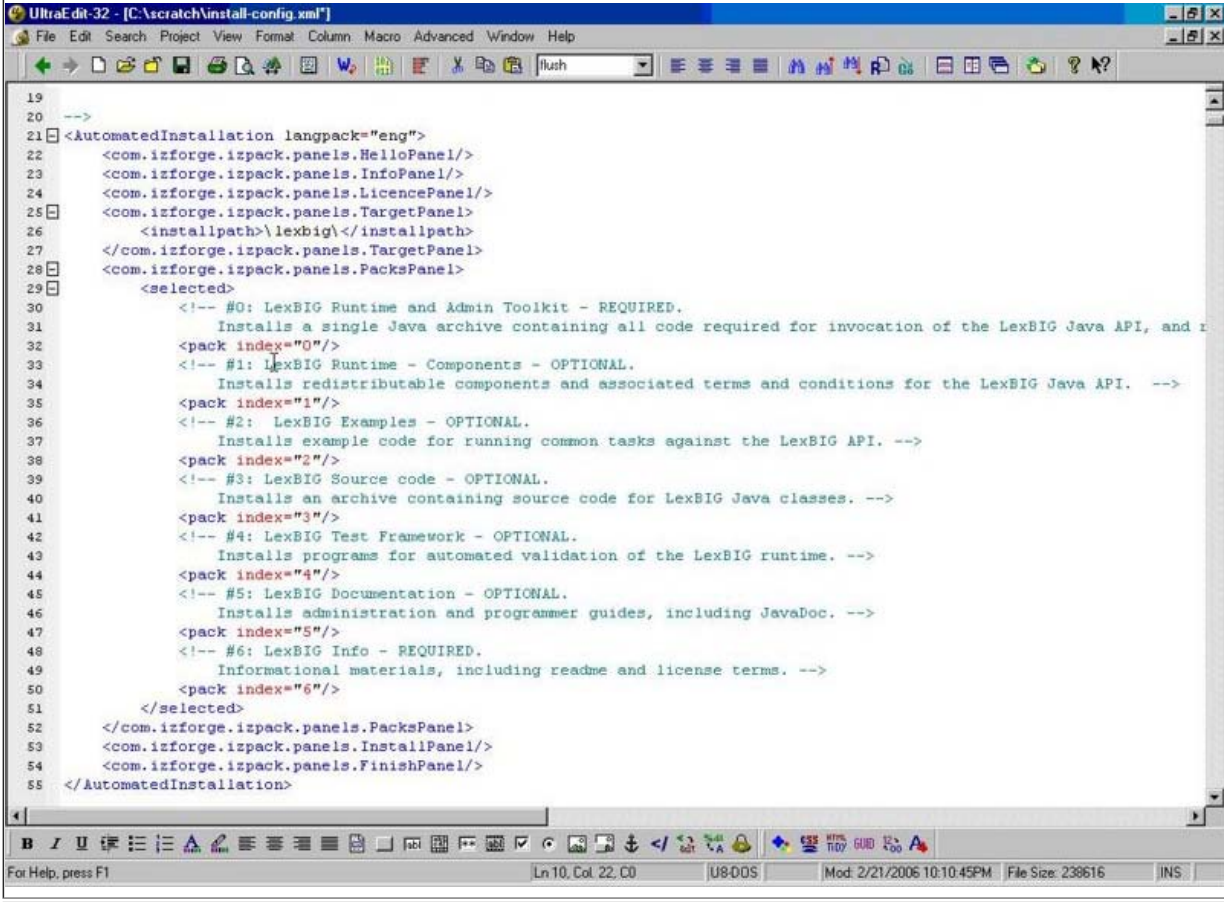
Installing LexEVS using the command line



To best understand the installation and testing procedures for LexEVS, it is recommended that you follow the procedures described in this section with minimal deviation.

Complete the following steps to download and install LexEVS using command line option.

Note that the screenshots are examples provided for clarification. The version numbers on your filenames may be different.

Step	Action
1	<p>Download the LexEVS v5.0 local runtime install package here: https://gforge.nci.nih.gov/docman/view.php/491/17562/LexEVS_50_localRuntimeAndGUI_installer.jar</p> <p>Download the LexEVS v5.0 command line configuration xml file here: https://gforge.nci.nih.gov/docman/view.php/491/17609/LexEVS-install-config-5.0.0.xml</p> <p>Download the LexEVS v5.1 local runtime install package here: https://gforge.nci.nih.gov/docman/view.php/491/20159/LexEVS-install-5.1.jar</p> <p>Download the LexEVS v5.1 command line configuration xml file here: https://gforge.nci.nih.gov/docman/view.php/491/20166/LexEVS-install-config-5.1.xml</p>
2	<p>Select the most recent version of the LexEVS Software Package LexEVSxx-install.jar (e.g. 1.0.1, lexbig-install-1.0.1.jar). Save this file to your computer. This location will be referred to as the SAVE_DIRECTORY. You may have to disable pop-up blockers to allow save the install package to your local computer.</p>
3	<p>Select the install-config.xml file. Save this file to your SAVE_DIRECTORY.</p>
4	<p>Edit the install-config.xml file to configure the components to be installed. The install path can be modified to the location of choice. Components LexEVS Runtime and Admin Toolkit and LexEVS Info are required. Remove lines in install-config.xml file for those components you do not want to be installed. By default, the file is configured to install all packages.</p>  <pre> 19 20 --> 21 <AutomatedInstallation langpack="eng"> 22 <com.izforge.izpack.panels.HelloPanel/> 23 <com.izforge.izpack.panels.InfoPanel/> 24 <com.izforge.izpack.panels.LicencePanel/> 25 <com.izforge.izpack.panels.TargetPanel> 26 <installpath>\lexbig\</installpath> 27 </com.izforge.izpack.panels.TargetPanel> 28 <com.izforge.izpack.panels.PacksPanel> 29 <selected> 30 <!-- #0: LexBIG Runtime and Admin Toolkit - REQUIRED. 31 Installs a single Java archive containing all code required for invocation of the LexBIG Java API, and 32 <pack index="0"/> 33 <!-- #1: LexBIG Runtime - Components - OPTIONAL. 34 Installs redistributable components and associated terms and conditions for the LexBIG Java API. --> 35 <pack index="1"/> 36 <!-- #2: LexBIG Examples - OPTIONAL. 37 Installs example code for running common tasks against the LexBIG API. --> 38 <pack index="2"/> 39 <!-- #3: LexBIG Source code - OPTIONAL. 40 Installs an archive containing source code for LexBIG Java classes. --> 41 <pack index="3"/> 42 <!-- #4: LexBIG Test Framework - OPTIONAL. 43 Installs programs for automated validation of the LexBIG runtime. --> 44 <pack index="4"/> 45 <!-- #5: LexBIG Documentation - OPTIONAL. 46 Installs administration and programmer guides, including JavaDoc. --> 47 <pack index="5"/> 48 <!-- #6: LexBIG Info - REQUIRED. 49 Informational materials, including readme and license terms. --> 50 <pack index="6"/> 51 </selected> 52 </com.izforge.izpack.panels.PacksPanel> 53 <com.izforge.izpack.panels.InstallPanel/> 54 <com.izforge.izpack.panels.FinishPanel/> 55 </AutomatedInstallation> </pre>
5	<p>At command prompt in the SAVE_DIRECTORY enter the command:</p> <pre>java -jar LexEVSxx-install.jar install-config.xml</pre>

```

C:\WINDOWS\system32\cmd.exe
C:\scratch>java -jar lexbig-install-1.0.0.jar install-config.xml
[ Starting automated installation ]
[ Starting to unpack ]
[ Processing package: LexBIG Runtime and Admin Toolkit (1/7) ]
[ Processing package: LexBIG Runtime - Components (2/7) ]
[ Processing package: LexBIG Examples (3/7) ]
[ Processing package: LexBIG Source code (4/7) ]
[ Processing package: LexBIG Test Framework (5/7) ]
[ Processing package: LexBIG Documentation (6/7) ]
[ Processing package: LexBIG Info (7/7) ]
[ Unpacking finished. ]
[ Writing the uninstaller data ... ]
[ Automated installation done ]

C:\scratch>

```

Configuring the LexEVS environment

The LexEVS install provides a `lbconfig.props` file to configure options for the LexEVS service and database settings. The LexEVS Service can be configured to work with many different databases – but the recommended databases are MySQL 5.0.45 (or higher) or PostgreSQL 8.x. Following installation, the Administrator should examine the `lbconfig.props` file and make any changes required to match the target database and runtime environment.

Server properties

Modifying the `lbconfig.props` file for LexEVS

- The file `{LEXEVS_DIRECTORY}/resources/config/lbconfig.props` contains properties controlling the behavior of the LexEVS runtime.
- This guide has an overview of the options in this file – however the file also has documentation embedded inside of it. The documentation inside the `lbconfig.props` file should be considered authoritative if there is a conflict between the documentation written here and that contained in `lbconfig.props`.
- Table 4a contains the variables that you must modify so that LexEVS can properly use your database.
- Table 4b contains the variables that you can change for performance reasons or alternative deployment scenarios, but you probably don't need to change in a standard LexEVS installation.
- When constructing file paths, you must use either `'/'` or `'\\'`. `'\'` is not valid within the `lbconfig.props` file for file paths (it is ok for JDBC connection strings).

Table 4a Variables that must be set prior to use of LexEVS


Property Name	Description
SINGLE_DB_MODE	LexEVS can be configured to run within a single database (and it will use a numbering scheme on its tables) – or it can be configured to use multiple databases on a single server (and it will use a numbering scheme on its databases). It is completely up to the administrator which way will work better in their database environment. The default value is <code>'false'</code> – which will cause it to use multiple databases on a server.
DB_URL	The address of your database server. The value that you put here will be dependant on the <code>SINGLE_DB_MODE</code> variable. If <code>SINGLE_DB_MODE</code> is <code>'true'</code> then this value should be a complete path that includes the DB name. For example: <code>DB_URL=jdbc:mysql://hostname/LexEVSDB</code> If <code>SINGLE_DB_MODE</code> is <code>'false'</code> then this value should be a path that does NOT include the DB name. For example: <code>DB_URL=jdbc:mysql://hostname/</code>
DB_PREFIX	The prefix to use on all tables or databases that LexEVS creates. If <code>SINGLE_DB_MODE</code> is <code>'true'</code> then this prefix will be used on tables. If <code>SINGLE_DB_MODE</code> is <code>'false'</code> then this value will be used on databases. Note: If you wish to run multiple LexEVS installations on the same database server, give them each a unique prefix. Note: Do not use dashes <code>'-'</code> in the <code>db_prefix</code> value. Recommended characters are alphanumeric (a-z, 0-98) and underscore <code>'_'</code> . Note: If your database is Oracle, you may not use this feature. Leave the value blank.
DB_PARAM	Optional variable for passing extra database parameters. These will be appended to the end of the database connection string.
DB_DRIVER	The Java class name that represents the driver that you wish to use with your database.
DB_USER	The database username and password.
DB_PASSWORD	If <code>SINGLE_DB_MODE</code> is <code>'true'</code> this account must have permission to add and remove tables, indexes, etc inside of this database. If <code>SINGLE_DB_MODE</code> is <code>'false'</code> this account must have permission to create and drop new databases.

Table 4a - LexEVS configuration parameters

Table 4b Variables that must be set prior to use of LexEVS	
Property Name	Description
LG_CONFIG_FILE	<p>This is not actually a variable that you would set within this file. It is documented here for clarity of other variables that depend on this variable.</p> <p>Normally, this variable is automatically set (at runtime) to the location of the lbconfig.props file that is being used by the runtime.</p> <p>Alternatively, you can set the java system variable 'LG_CONFIG_FILE' at system startup to point to the lbconfig.props file that you want LexEVS to use. Refer to additional documentation in the lbconfig.props file if you need to use this feature.</p>
LG_BASE_PATH	<p>This variable is the path that will be used to resolve any other relative (or unqualified) paths in the lbconfig.props file.</p> <p>This variable is optional, and should usually be left blank.</p> <p>If this variable is left blank, it will automatically be set (at runtime) to the location of the folder which contains the lbconfig.props file that the system was started with.</p> <p>This variable can also be overridden by setting the java system variable 'LG_BASE_PATH'.</p>
JAR_FILE_LOCATION	<p>The path of the folder that contains your SQL drivers and LexEVS extensions (if you have any).</p> <p>This value can be relative to the 'LG_BASE_PATH' or absolute.</p>
REGISTRY_FILE	<p>The location of the file that will store information about all loaded terminologies.</p> <p>This value can be relative to the 'LG_BASE_PATH' or absolute.</p>
INDEX_LOCATION	<p>The folder where all LexEVS generated indexes will be stored. This folder can potentially be large (100+ GB) – depending on the terminologies loaded.</p> <p>This value can be relative to the 'LG_BASE_PATH' or absolute.</p>
MAX_CONNECTIONS_PER_DB	<p>LexEVS maintains a pool of connections to each database that it connects to. This sets the limit on the number of connections that will be opened.</p> <p>If SINGLE_DB_MODE is 'true' you may want to set this to a higher value – 20 or so (depending on expected user load)</p> <p>If SINGLE_DB_MODE is 'false' you should keep this value smaller – the default is 8.</p>
CACHE_SIZE	<p>LexEVS maintains an internal cache of some information that it needs to query from the database to resolve queries. This controls the size of that cache. This cache does not hold entire user queries.</p> <p>The default size is 500.</p>
ITERATOR_IDLE_TIME	<p>The length of time to allow an unused (and unclosed) iterator to stay valid before it is closed (and its resources freed) by the system.</p>
MAX_RESULT_SIZE	<p>This controls the maximum number of results that a user can resolve at one time for the CodedNodeSets and CodedNodeGraphs.</p> <p>Iterators are not limited by this value.</p>
LOG_FILE_LOCATION	<p>The path where LexEVS log files will be written.</p> <p>This value can be relative to the 'LG_BASE_PATH' or absolute.</p>
DEBUG_ENABLE	<p>Setting debug to 'true' will give you more verbose logging information to debug problems. The default setting is 'false'. This should normally be set to 'false' since debug logging causes a negative performance impact.</p>
LOG_CHANGE	<p>Indicates when a new log file should be started. This can be set to 'monthly', 'weekly' or 'daily'.</p> <p>This can also be set to a number – which will cause it to start a new log file whenever it reaches X MB in size.</p>
ERASE_LOGS_AFTER	<p>If 'LOG_CHANGE' is set to 'daily', 'weekly', or 'monthly', this variable instructs the service to remove log files that have not been written to in X days.</p> <p>Note: The unit is treated as days regardless of the LOG_CHANGE value. Cleanup will only occur on restart of the JVM.</p> <p>If 'LOG_CHANGE' is set to a number, this is the number of old log files that will be kept.</p>
EMAIL_ERRORS	<p>Used to enable or disable e-mail notification of system errors and warnings. Default is 'false'. If you set this to 'true', you must set the next two variables.</p>
	<p>The SMTP server to use to send errors over e-mail.</p>

SMTP_SERVER	Only applicable when EMAIL_ERRORS is set to 'true'.
EMAIL_TO	A comma separated list of e-mail address to set failure and warning notifications to. Only applicable when EMAIL_ERRORS is set to 'true'.

Table 4b - LexEVS configuration parameters

	<p>It is considered beyond the scope of this manual to address database (e.g. MySQL or PostgreSQL) setup and administration. However, proper database configuration is critical to the performance and long-term health of the LexEVS environment.</p> <p>System administrators should consult the MySQL or PostgreSQL documentation to determine settings that are appropriate to the host machine and environment. Tuning should be performed prior to loading vocabularies.</p> <p>The following tables provide settings that have been modified in database environments used during LexEVS development and adoption, and are provided for consideration by database administrators.</p>
---	--

MySQL properties

Modifying the my.ini file for MySQL ■ The file {MYSQL_HOME_DIRECTORY}/my.ini contains properties controlling the behavior of the MySQL database server.

Property Name	Description
innodb_flush_log_at_trx_commit	Flush the transaction logs at each commit. Value: It is highly recommended that this option be set to '0' in Windows installations to improve load performance.
innodb_additional_mem_pool_size	Additional memory pool that is used by InnoDB to store metadata information. Value: 16M
innodb_buffer_pool_size	Buffer pool used to cache both indexes and row data. Value: 1G (consider going higher based on physical RAM available)
tmp_table_size	Maximum size for internal (in-memory) temporary tables. Value: 256M
query_cache_size	Query cache is used to cache SELECT results and later return them without actually executing the same query once again. Value: 64M
sort_buffer_size	This buffer is allocated when MySQL needs to rebuild the index in REPAIR, OPTIMIZE, ALTER table statements as well as in LOAD DATA INFILE into an empty table. Value: 16M

Table 5 – MySQL configuration parameters

PostgreSQL properties

Modifying the postgresql.conf File ■ The file {PostgreSQL_HOME_DIRECTORY}/postgresql.conf contains properties controlling the behavior of the PostgreSQL database server.

Property Name	Description
shared_buffers	Number of shared buffers. Value: 1000.
work_mem	The amount of memory in kilobytes allocated to working memory Value: 51200.
maintenance_work_mem	The amount of memory in kilobytes allocated to maintenance working memory. Value: 512000.
enable_seqscan	We set the 'enable_seqscan' to false to use always use an index versus a table scan.

Table 6 – PostgreSQL configuration parameters

Note: MySQL can be passed a jdbc option for the Windows local environment that may improve performance 30 to 50%.

Try the following values in the lbconfig.props file for the DB_URL:


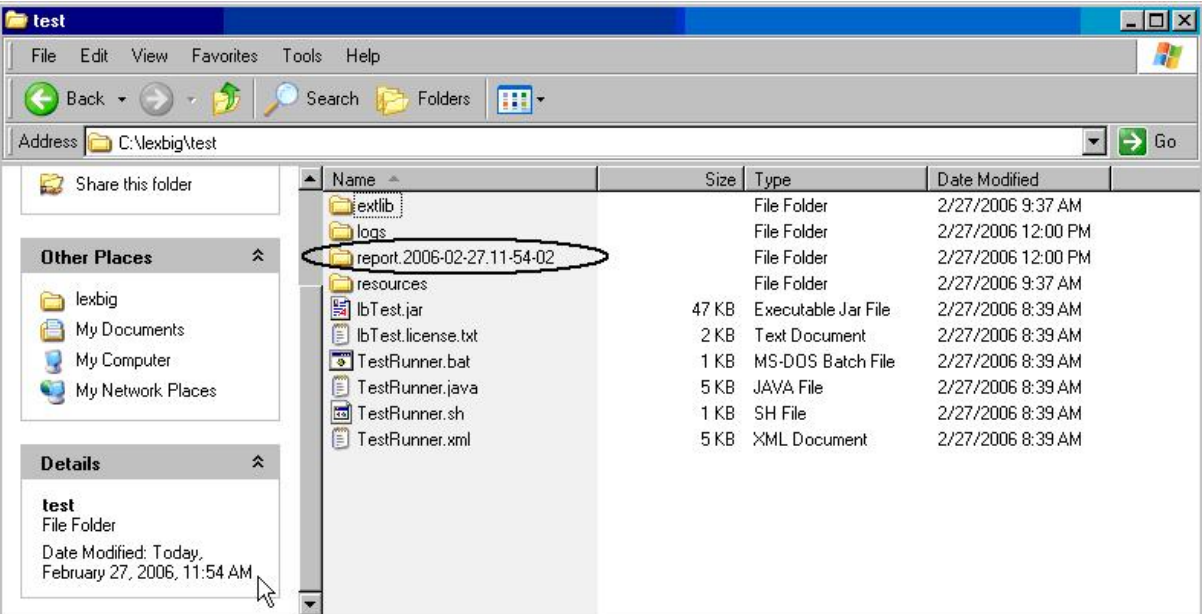
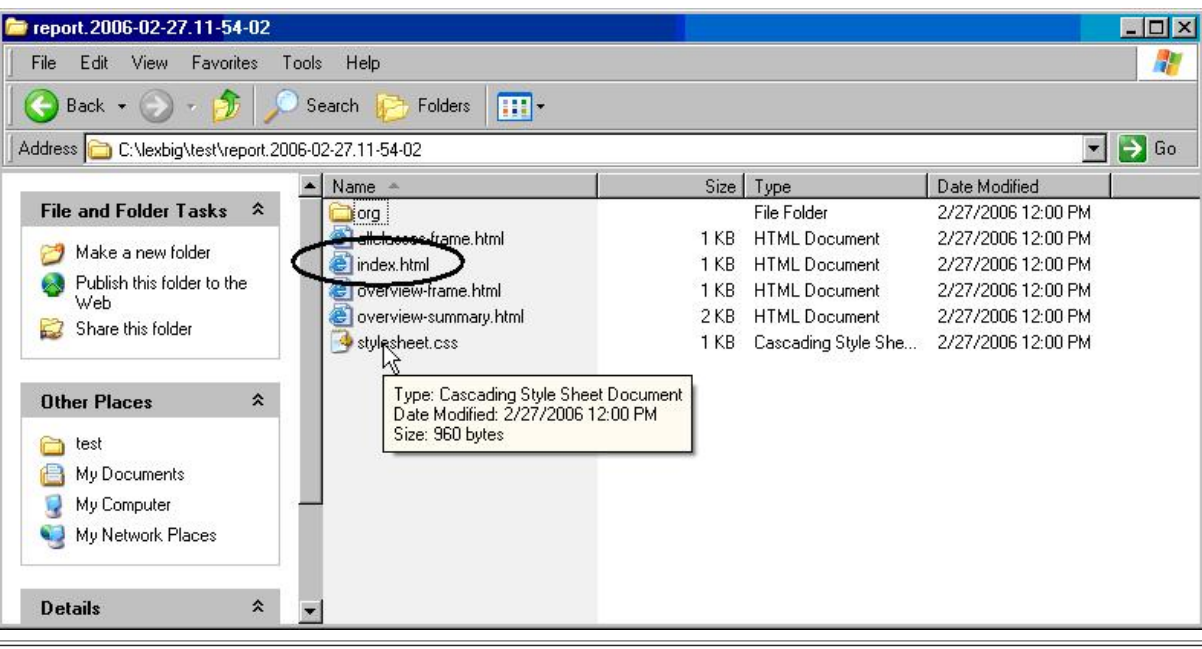
```
SINGLE_DB_MODE=true DB_URL=jdbc:mysql://<dbname>?socketFactory=com.mysql.jdbc.NamedPipeSocketFactory
```

This uses Windows Named Pipe function and avoids use of the TCP/IP protocol. It only works when connecting with a local iteration of the MySQL database on Windows.

Testing the LexEVS configuration

This LexEVS installation provides a test suite to verify and test the environment.

Note that the screenshots are examples provided for clarification. The version numbers on your filenames may be different.

 Note	The LexEVS runtime and database environments must still be configured prior to invoking the test suite, as described above.
Step	Action
1	In a Command Prompt window, enter <code>cd {LEXEVS_DIRECTORY}/test</code> to go to the test directory
2	Run the TestRunner utility to start the test process. For Windows Environment enter <pre>> TestRunner.bat -h</pre> For Linux Environment enter <pre>> TestRunner.sh -h</pre>
3	Use file explorer to navigate to the directory that contains the test report. The report is placed in the {LexEVS_DIRECTORY}/test. 
3	Navigate to the report that represents the date and time you executed the test. 

Review the test results opening index.html file using a web browser.

4

Unit Test Results
Designed for use with [JUnit](#) and [Ant](#).

Class org.LexGrid.LexBIG.test.AllTests

Name	Tests	Errors	Failures	Time(s)
AllTests	6	0	0	362.310

Tests

Name	Status	Type	Time(s)
testT1_ADM_06_1a	Success		16.764
testT1_ADM_06_1b	Success		16.163
testT1_ADM_08_3a	Success		329.023
testT1_ADM_03_1a	Success		0.020
testT1_ADM_03_1b	Success		0.020
testT1_ADM_03_1c	Success		0.020

[Properties >](#)
[System.out >](#)
[System.err >](#)

Congratulations! If the test passes all tests, you have successfully installed the LexEVS software.

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