

Debugging Building Blocks Issues

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Agenda

- Manual approach
- Automated approach
 - Starting Block Demo
- Advanced approach
 - Remote Debugging Demo

Manual approach

1. Code
2. Compile
3. Assemble/package into WAR/Zip file
4. Log into development server
5. Install via SysAdmin panel
6. Make Active & Available
7. Hit page to test
8. View logs for errors
9. Fix code issue(s)
10. Iterate by uninstalling/reinstalling or directly editing JSPs

Advantages: Quick and basic, easy

Disadvantages: Time-intensive, errors hard to detect, trial & error



Editing JSPs

- Disable JSP caching in Tomcat configuration
 1. Navigate to `/blackboard/config/tomcat/conf/web.xml`
 2. Change the value for `<param-name>development</param-name>` to `true`
 3. Set the value for `<param-name>modificationTestInterval</param-name>` to `1`
 4. Add the value for `<param-name>checkInterval</param-name>` and set it to `1`
 5. Run the command `/blackboard/tools/admin>PushConfigUpdates.bat/.sh`
- Navigate to directory on file system
 - `/blackboard/content/vi/bb_bb60/plugins/b2-handle/webapp/...`
- Modify JSPs, changes reflected on next page refresh
- Occasionally have to clear Tomcat work directory
 - `/blackboard/apps/tomcat/work/Catalina/localhost/webapps_b2-handle/...`

Relevant logs

- /blackboard/logs/bb-services-log.txt
 - API Services exceptions
 - Login & authentication exceptions
 - Portal and Portal Modules exceptions
 - Building Blocks
- /blackboard/logs/tomcat/catalina-log.txt.timestamp
- /blackboard/logs/tomcat/stdout-stderr-timestamp.txt
 - Java App Server exceptions (stderr)
 - Java App Server output (stdout)
 - 404 page error
 - Page can't compile
 - Stack trace error
- /blackboard/logs/ws/*.WS.log
 - Web Services logs
 - /blackboard/webapps/ws/WEB-INF/conf/axis2.xml (requires services restart)
<parameter name="sendStacktraceDetailsWithFaults">true</parameter>

Using Logs

- “Real-time” System monitoring
 - `tail -f file.log`
 - Watch what is happening with the system as it happens
- Beneficial to use logging package (i.e. log4j) within your own Building Block
 - Keeps history of issues you ran into while debugging (when, where and what happened)
 - Eliminates (or at least limits) the usage of `System.out.println`
 - Can set levels which can easily be changed later (DEBUG, INFO, WARN, ERROR)
 - Flexible with advanced features

Common errors

- Permissions security exceptions
 - java.security.AccessControlException: access denied
(blackboard.data.AttributePermission user.cardnumber get)
 - Requires `<permission type="blackboard.data.AttributePermission" name="user.cardnumber" actions="get">` in bb-manifest.xml
 - Can usually figure out the required permission by the error thrown

Other common permissions:

- `<permission type="java.io.FilePermission" name="/usr/local/blackboard/logs/tomcat/-" actions="read,write"/>`
- `<permission type="runtime" name="db.connection.*" />` (*Making calls using Default Blackboard Connection*)
- `<permission type="attribute" name="user.authinfo" actions="get"/>`
(*Blackboard User Object*)
- `<permission type="socket" name="*" actions="connect,resolve" />` (*Make external connections from Building Block, including DB calls*)

Common errors (continued)

- Key Not Found
 - Trying to load a data object that is in an inactive state (disabled)
- Tag library errors
 - Use the documentation in the TLD file
 - Unpack the `/blackboard/systemlib/bb-taglibs.jar` file to get the correct TLD file for your version
- Incompatible support libraries (JSP not available error)
 - Do not package `SAAJ.jar`, `bb-platform.jar`, or any library that already exists in `/blackboard/apps/tomcat/lib/` in your Building Block `/WEB-INF/lib` directory

Starting Block automation

- Packaged way to automate the manual process
- Ant script or HTTP call can deploy & enable B2 automatically
- Works on local dev environments only
- Available in the Downloads->Developer Tools area on EduGarage
 - Comes with a readme and instructions

Starting Block Demo

Advanced Tomcat Debugging

- Enables integrated IDE debugging capabilities with Tomcat
 1. Edit `/blackboard/config/bb-config.properties`
 2. Set `bbconfig.tomcat.debug.enable=true`
 3. Restart Blackboard services
- The Eclipse Debugger:
 - Can launch a JVM in Run or Debug mode
 - Attach to a running JVM
 - Run expressions on the fly, step through code line-by-line
 - Has “scrapbook” pages for interactive code snippet evaluation
 - Dynamic Class Reloading (where supported by the JVM)

Remote Debugging Demo



Questions/Comments??

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