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PCB DIFFER
USER MANUAL

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1. Introduction

This manual is intended for users and administrators of the PCB differ provided by Dizain-Sync. For users, it outlines available features and usage instructions; for administrators, it outlines features that are used to control the plugin as well as provides installation instructions.

2. Regular users

This section is detailing the features available to non-administrator users.

2.1 Diff tool plugin

2.1.1 Linking the data

The diff tool depends on data that has been linked to the commits. This data is not tracked by the VCS and is stored separately on the server. To link the data, the user must navigate to a custom form. Links to it can be found on the relevant commit's page as a "Link EDA data" button.

The form allows uploading of PDF files for a schematic diff and Gerber files in a ZIP folder for the PCB diff.

2.1.2 Performing the diff

The diff tool plugin can be accessed only by users who have write access to the repository. The controls to access the plugin will not be visible to the user with insufficient permissions, and in case the user tried to navigate to the page manually an error message will be displayed.

The plugin is accessed by clicking the "Diff Tool" button in the sidebar while in a repository, as seen in Figure 2. This presents the user with the following interface:

Here, the user can select the commits that are available for the diff. The checkmarks can be used to verify what type of data has been linked to a commit. For the diff to begin, two commits containing

the same type of data should be selected and an appropriate button pressed. For instance, after selecting commits with Gerber files linked to them, the "Diff PCBs" button should be pressed. If the data types do not match or a wrong button has been pressed, a relevant error message will be shown to the user.

Add data to diff

Data will be linked to commit ID 2d316e61b18eb2443d9fd5074f521c734406b935

Upload schematics No file chosen

Upload gerbers (as .zip) No file chosen

Figure 1. Form to link the data.

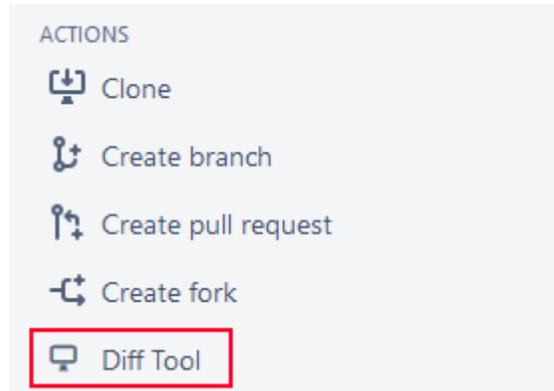
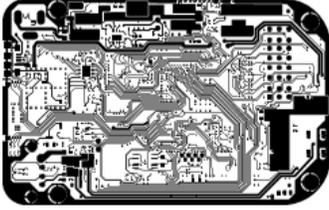
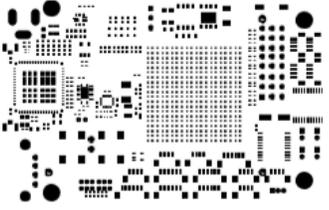
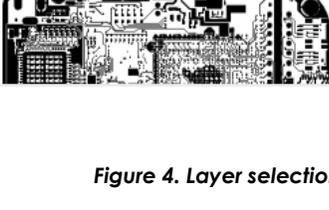


Figure 2. The "Diff Tool" button.

PCB differ

If a correct selection has been made, the user will be prompted to select a set of pages or layers to be diffed. The interface for this selection can be seen in Figure 4. It is also possible to skip the selection process and perform a diff

Select sheets/layers to diff

BottomCopper		<input type="checkbox"/> Diff this
SoldermaskTop		<input type="checkbox"/> Diff this
SilkscreenBottom		<input type="checkbox"/> Diff this
EAGLECopperLayer15		<input type="checkbox"/> Diff this
TopCopper		<input type="checkbox"/> Diff this

Cache this

Figure 4. Layer selection page.

on the entire stack of available schematic sheets or layers. The page selection is different for a PCB diff and for a schematic diff. This is because schematic sheets cannot be matched automatically due to the lack of metadata. In addition to being able to select individual pages, the user also can indicate whether the resulting diff has to be cached or not. This option is enabled by default.

The user will be updated on the progress of the diff. After it has been completed, all diffs will be shown in a tabbed view. The user must click on the tab with the layer/sheet name for it to be displayed! During the entire process, the errors one might encounter are related to internal processing and require attention from the system administrator.

3. Administrators

This section of the manual is intended for the administrators of the DDM system. Administrators have access to extra functionality that is mostly used to set up and control the plugin.

3.1 Installation

3.1.1 Prerequisites

Bitbucket

The plugins were developed and tested on Bitbucket 7.2.4; hence, this is the recommended version to install. The system requirements and supported tool are listed on the [“Supported platforms”](#) page. It should also be noted that Bitbucket has to be installed on a Linux system due to the way plugins were developed. Contact the developers if this is not possible.

Database

It is recommended to use PostgreSQL as the database for the Bitbucket Server install. This database is supported in all Atlassian products, unlike MySQL, which is not supported in the Data Center versions, requires a separate driver and has compatibility issues with specific versions. It is, nevertheless, possible to use MySQL.

The PostgreSQL database should have a dedicated user that can create tables. Authentication with a password is optional. It is needed if the database is run on a separate server; in this case, some extra configuration steps are needed. Many guides can be found online to fit different systems; a guide for Ubuntu can be found [here](#).

3.1.2 Installation procedure

Bitbucket

Bitbucket provides an installer for both Windows and Linux installs. In addition, the Bitbucket support website will have a set of preliminary checks available that need to be performed for the installation to succeed. Please note that in production environments the Bitbucket server should be run from a dedicated user.

On Linux, there is an option to install Bitbucket manually as well. However, it is recommended that an installer is used since it will handle all the permissions and user creation properly. The instructions can be found on the [“Install Bitbucket Server for Linux”](#) page.

After installation, it is recommended to go through the “Administration” section in Bitbucket and resolve the suggestions given by the page. Usually, the administrator will be prompted to set up a database connection and set up a mail server.

Important: If the server reports a base URL mismatch (i.e. it has inferred a different base URL than the one used to access the server itself), the base URL must be updated in the settings before any actions with the plugin are made.

Plugin

The plugin installation and licensing is done through Atlassian Marketplace.

3.1.3 Security considerations

Currently, Atlassian does not support using HTTPS with their products. That is to say, that configuration is possible, but no technical support relating to issues with said connection is provided. [Refer to this article for further information.](#) As such, the following setup is recommended for the server:

- Bitbucket is running on an internal network. They could be run on separate machines or on the same one.
- No machine that runs a component of the DDM system can be accessed from the Internet.
- If access to the system is needed off-site, a VPN solution must be provided for the users of the system.

By using a VPN and shielding the DDM framework from outside access, the security of the system is easier to ensure.

3.2 Updates

3.2.1 Bitbucket

If the installer was used (the recommended way), updating Bitbucket is simple. Before the upgrade, make sure to read the end of support announcements and the version-specific upgrade notes. Bitbucket also provides a tool that allows you to check if all the apps and addons that were installed are compatible with the new version. **Uninstall the DDMX plugin before continuing!** Keeping it can cause some issues during upgrade. Note that it is not an in-place upgrade, and the old version will not be deleted afterwards.

After the initial checks were completed, you should follow the instructions outlined in the [Bitbucket Server upgrade guide](#).

Note that a backup of the data stored by Bitbucket is recommended. This can simply be a zip file. Alternatively, one of the tools suggested by Atlassian can be used. This decision is up to the administrator. The external database has to be backed up separately. In PostgreSQL, this is done easily with the provided toolset.

3.2.2 Plugin

Upgrading the plugin is also done through the Atlassian Marketplace. Note that receiving updates is only possible with a valid maintenance license!

3.3 Bitbucket setup

Bitbucket takes care of many things internally; it is up to the administrator to configure some custom parts of the installation such as for example the database connection and the mail client.

To set the database up, a database account with a valid set of credentials that can also create tables should be used. Several databases can be used, like PostgreSQL, MSSQL, Oracle and MySQL. However, use of MySQL is discouraged due to the fact it is not fully supported and can become slow at scale.

The email configuration is straightforward and requires a mail user that can send out emails. A custom alias can also be set up.

3.4 Plugin settings

The administrator must set up the plugin before it can be fully used. For that, a special page is added to Bitbucket settings. On this page, administrator can see how much space the data linked to the diff tool takes up on disk.

The diff tool also needs an extra component – a third-party executable to convert Gerber files to PDF files. This executable can be uploaded using the file upload form provided on the page. This is the preferred method, since the upload function will also set the correct permissions for the file. It is possible to upload the file manually if something goes wrong.

To do that, navigate to the folder where Bitbucket was installed. Change directories to `/bitbucket/app/`. This is where the data storage for the diff tool plugin is located. Check

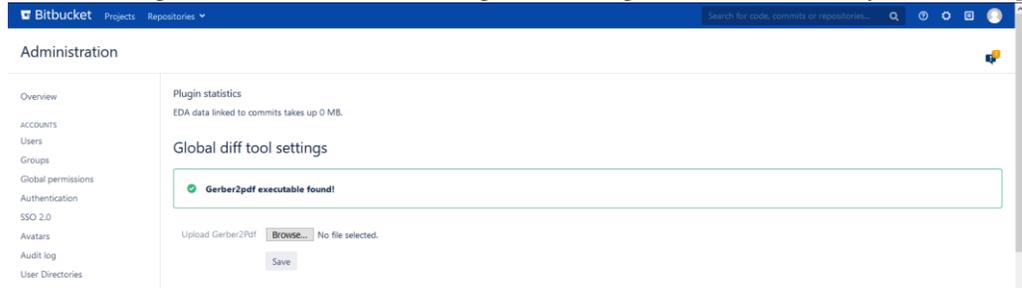


Figure 5. Administrator settings page.

if the directory called `diffData` exists; if not, create it and set permission levels to 775. Additionally, make sure that the owner for the directory is the same as for the other directories in the Bitbucket installation. Afterward, upload the Gerber2pdf file using a file transfer tool of choice. The file needs to be mode executable for group members, so to finalize the installation set the permissions and the owner to match the `diffData` directory.

The `diffData` directory is created when the user first uploads data or tries to use the diff tool. In that case, all permissions and owners are set automatically so it is advised to let the plugin handle it.

3.5 Cache settings

Finally, (repository) administrators have access to a page that allows for configuration of the diff tool cache, accessed through a specific button as shown in Figure 6. The settings page has controls that let the administrator change delete the existing cache data, but more importantly, adjust the cache size limit. The limit is used to prevent excessive bloating. If a diff is made and storing it will exceed the limit, all images are displayed but not stored in cache no matter the setting the user chose. To enable users to store caches again, the limit has to be raised or some data deleted; this is up to the administrator to decide.

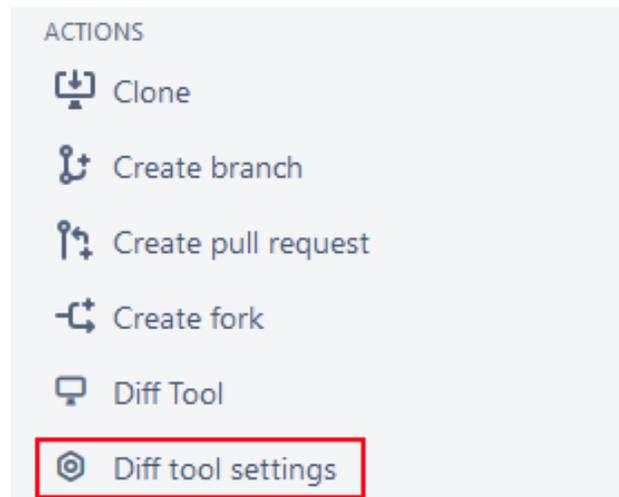


Figure 6. Diff tool settings access.

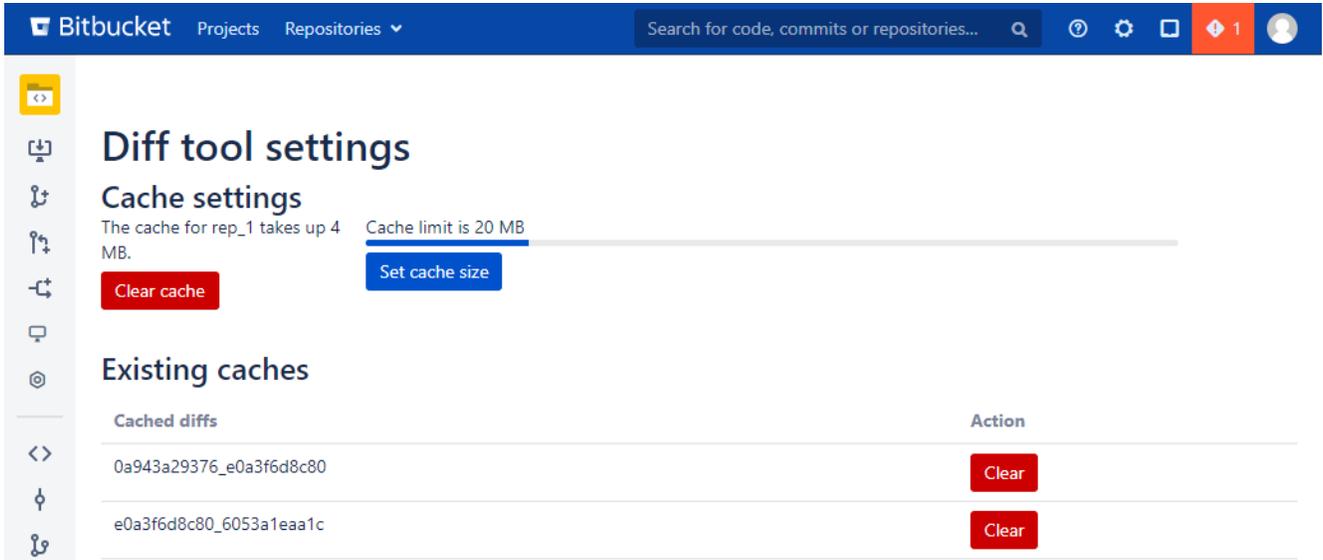


Figure 7. Diff tool settings interface.

3.6 Data deletion

A regular user can only upload design data. If more space is needed on the server or some of the data is very old, the administrator can delete the linked data from a commit. Due to how destructive this feature can be, its usage is limited to repository admins.

EDA diff tool

Pick two instances to diff:

Commit ID	Gerber files	Schematic files	Selection	Action
0a943a29376f2336b78312d99e65da17048951db	✓	✗	<input type="checkbox"/> Compare this instance	Delete data
e0a3f6d8c804c375f49d7609328111e8dc75a4bc	✓	✓	<input type="checkbox"/> Compare this instance	Delete data
6053a1eaa1c009dd11092d09a72f3c41af1b59ad	✗	✓	<input type="checkbox"/> Compare this instance	Delete data

Diff PCBs Diff schematics

Figure 8. Diff tool selection interface with data deletion button.