LOOT Documentation

Release latest

WrinklyNinja

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APPLICATION DOCUMENTATION

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CHAPTER

ONE

INTRODUCTION

LOOT is a plugin load order optimiser for:

- Starfield
- The Elder Scrolls III: Morrowind
- The Elder Scrolls IV: Oblivion
- The Elder Scrolls V: Skyrim
- The Elder Scrolls V: Skyrim Special Edition (and Anniversary Edition)
- The Elder Scrolls V: Skyrim VR
- Fallout 3
- Fallout: New Vegas
- Fallout 4
- Fallout 4 VR
- Nehrim: At Fate's Edge
- Enderal: Forgotten Stories
- Enderal: Forgotten Stories (Special Edition)

LOOT can automatically calculate a load order that satisfies all plugin dependencies and maximises each plugin's impact on your game. It can also detect many issues, and provides a large number of plugin-specific usage notes, warnings and Bash Tag suggestions for Wrye Bash.

While LOOT can correctly handle the vast majority of plugins without help, some plugins need additional metadata to be sorted correctly. LOOT has a masterlist of metadata for each supported game, and you can add more to customise LOOT's behaviour.

LOOT helps make using mods easier, and you should still possess a working knowledge of mod load ordering. See Introduction To Load Orders for an overview.

CHAPTER

TWO

INSTALLATION & UNINSTALLATION

2.1 Windows

LOOT requires a 64-bit version of Windows 10 (1809) or later.

LOOT can be installed either using its automated installer or manually from a release archive. If you are using the installer, just run it and follow the wizard steps. If installing manually, extract the downloaded archive to a location of your choice.

LOOT requires the MSVC 2019 x64 redistributable to be installed.

The installer automatically downloads and installs the redistributable if you don't already have them installed, but if you use the release archive then you will need to do so manually.

If LOOT was installed using the installer, then use the uninstaller linked to in the Start Menu to uninstall LOOT. If LOOT was installed manually:

1. Delete the files you extracted from the location you chose.
2. Delete the `LOOT` folder in your local application data folder, which can be accessed by entering `%LOCALAPPDATA%` into Windows' File Explorer.

2.2 Linux

LOOT requires a 64-bit version of Linux.

LOOT can be installed as a Flatpak application or from a release archive. The Flatpak approach is recommended over using a release archive as the latter does not include any third-party dependencies, which must be installed separately.

You may be able to install and uninstall the LOOT Flatpak application through your Linux distribution's package manager.

If your Linux distribution's package manager does not support Flatpak, first install Flatpak if it is not already installed, and then install LOOT from Flathub.

The Flatpak application can be uninstalled using the command line:

```
flatpak uninstall io.github.loot.loot
```

Or, if you want to also remove the data that LOOT stores in `~/.var/app/io.github.loot.loot`:

```
flatpak uninstall --delete-data io.github.loot.loot
```

CHAPTER

THREE

INITIALISATION

When LOOT is run, it will attempt to detect which of the supported games are installed. If a *default game* has been set, LOOT will run for it, otherwise it will run for the same game as it last ran for. If the relevant game cannot be detected, or if there is no record of the last game LOOT ran for, it will run for the first detected game.

LOOT's initialisation can be customised using command line parameters:

`--game=<game identifier>`:
: Set the game to run for. If the supplied game identifier is recognised, the default and last game values are ignored. The game identifiers recognised by default are `Starfield`, `Morrowind`, `Oblivion`, `Skyrim`, `Skyrim Special Edition`, `Skyrim VR`, `Fallout3`, `FalloutNV`, `Fallout4`, `Fallout4VR`, `Nehrim`, `Enderal` and `Enderal Special Edition`. If you have multiple installs of a supported game then their identifiers will be different. The identifier values are the same as the game installs' LOOT folder names, which are visible in LOOT's Settings dialog.

`--game-path=<path>`:
: Set the install path of the game identified by `--game`. This replaces any existing value stored in LOOT's settings.

`--loot-data-path=<path>`:
: Set the path to use for LOOT's application data storage. If this is an empty string or not specified, LOOT defaults to `%LOCALAPPDATA%\LOOT` on Windows and (in order of decreasing preference) `$XDG_DATA_HOME/LOOT` or `$HOME/.local/share/LOOT` on Linux. Note that when running LOOT as a Flatpak application on Linux, Flatpak internally overrides `$XDG_DATA_HOME` to be `$HOME/.var/app/io.github.loot.loot/data`.

`--auto-sort`:
: Once LOOT has initialised, automatically sort the load order, apply the sorted load order, then quit. If an error occurs at any point, the remaining steps are cancelled. If this is passed, `--game` must also be passed.

If LOOT cannot detect any supported game installs, you can edit LOOT's settings in the *Settings dialog* to provide a path to a supported game, after which you can relaunch LOOT to detect that game.

Once a game has been set, LOOT will scan its plugins and load the game's masterlist, if one is present. The plugins and any metadata they have are then listed in their current load order.

If LOOT detects that it is the first time you have run that version of LOOT, it will display a "First-Time Tips" dialog, which provides some information about the user interface that may not be immediately obvious.

3.1 Microsoft Store Compatibility

LOOT supports games bought from the Microsoft Store or obtained through a Game Pass subscription, but the following games have each of their localisations installed in separate subdirectories:

- Morrowind
- Oblivion
- Fallout 3
- Fallout: New Vegas

LOOT will check the localisations in the order of Windows' preferred UI languages, stopping at the first subdirectory it finds a copy of the game in.

Note: LOOT does not support detecting game installs from before February 2022 (installed using Xbox app versions earlier than 2202.1001.7.0). Such installs have limitations that cause issues for LOOT and other modding utilities.

3.2 Epic Games Store Compatibility

LOOT supports games bought from the Epic Games Store, but Fallout 3 and Fallout: New Vegas are installed in the same way as they are installed by the Xbox app, so LOOT will pick one localisation as described for the Microsoft Store above.

3.3 Install Location Detection

When LOOT starts, it first loads its configured game settings. If the `--game` and `--game-path` command line parameters are given it overrides the configured path for the given game using the given path. It then searches for supported games using all of the following sources:

- the install location given in Steam's configuration files
- the install location(s) given in the Heroic Games Launcher's configuration files
- the game's Steam Registry key(s)
- the game's GOG Registry key(s)
- the parent directory of the current working directory (e.g. if LOOT is at `Skyrim Special Edition\LOOT\LOOT.exe` next to `Skyrim Special Edition\SkyrimSE.exe`)
- the game's non-store-specific Registry key
- the install location given in the Epic Games Launcher's manifest files
- the install locations used by the Xbox app, checking each drive in the order they're listed by Windows

The detected games are merged with the configured game settings, primarily by comparing the detected and configured game install paths. Any detected games that did not have matching configuration get new settings entries added for them. If multiple copies of a single game are detected, each instance is named differently in LOOT's settings to help differentiate between them.

For example, if you've got Skyrim installed through Steam and the Microsoft Store, LOOT will find both installs, and may name one "TES V: Skyrim (Steam)" and the other "TES V: Skyrim (MS Store)".

If LOOT's automatic game detection doesn't work correctly for you, you'll need to manually provide the correct install path in LOOT's settings and then relaunch LOOT.

3.3.1 Game Detection on Linux

On Linux, LOOT can only automatically detect games that were installed through Steam or through the Heroic Games Launcher.

If running LOOT as a Flatpak application, it only has permission to access the following paths by default:

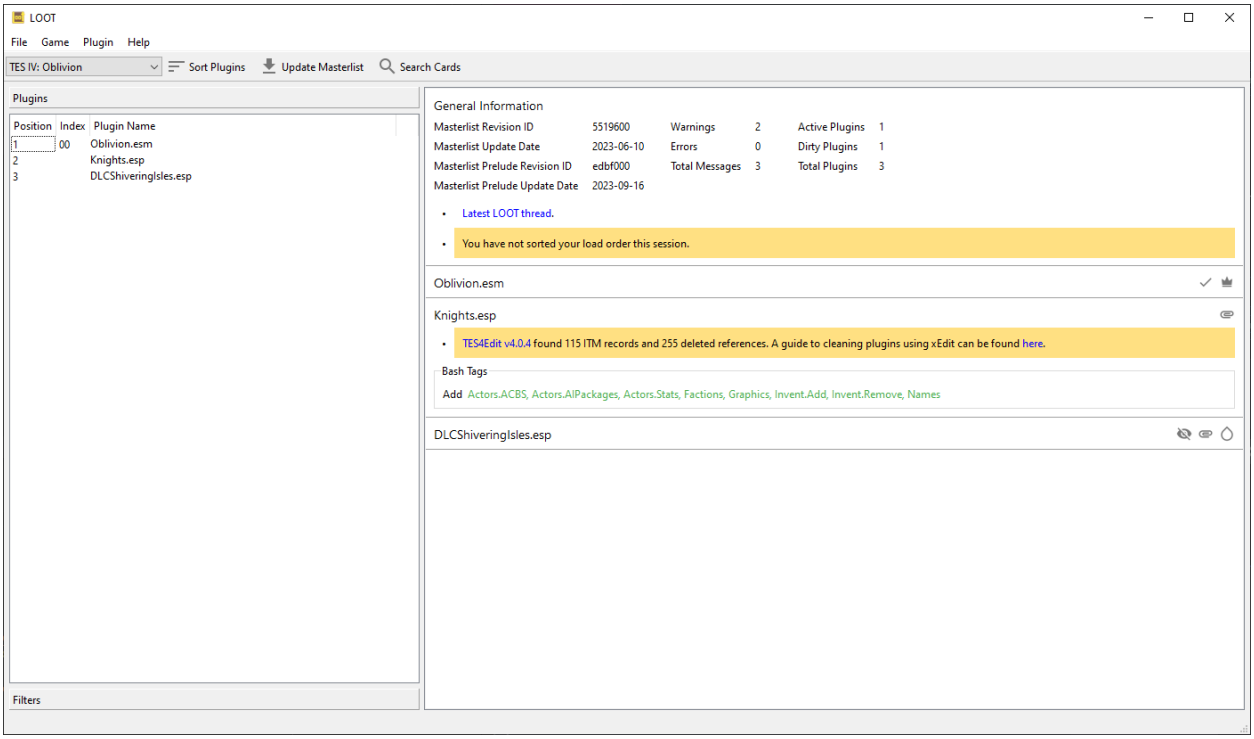
- `$XDG_DATA_HOME/Steam`
- `~/.var/app/com.valvesoftware.Steam/.local/share/Steam`
- `/run/media`
- `$XDG_CONFIG_HOME/heroic`
- `~/.var/app/com.heroicgameslauncher.hgl/config/heroic`
- `~/Games/Heroic`

Those paths grant access to the default Steam and Heroic Games Launcher directories. If you have installed games elsewhere, you will need to grant LOOT access to the relevant paths. This can be done using an application such as Flatseal or on the command line using `flatpak --user override --filesystem=<path> io.github.loot.loot`.

CHAPTER

FOUR

THE MAIN INTERFACE



4.1 The Menu Bar

The menu bar consists of the File, Game, Plugin and Help menus. Some menus and menu items are disabled when there is an unapplied sorted load order and while the metadata editor is open. If you're trying to use an option that is faded out, first close the metadata editor, or apply or discard a sorted load order. Additionally, the whole Plugin menu is disabled unless there is a plugin selected in the sidebar.

A few items in the menus are not self-explanatory:

- "Redate Plugins…" is provided so that Skyrim and Skyrim Special Edition modders may set the load order for the Creation Kit. It is only available for Skyrim, and changes the timestamps of the plugins in its Data folder to match their current load order. A side effect of changing the timestamps is that any Steam Workshop mods installed will be re-downloaded.
- "Copy Load Order" copies the displayed list of plugins and the decimal and hexadecimal indices of active plugins to the clipboard. The columns are:

1. Decimal load order index
2. Hexadecimal load order index
3. Hexadecimal light plugin index
4. Plugin name

- "Copy Content" copies the data displayed in LOOT's cards to the clipboard as YAML-formatted text.
- "Refresh Content" re-scans the installed plugins' headers and regenerates the content LOOT displays. This can be useful if you have made changes to your installed plugins while LOOT was open. Refreshing content will also discard any CRCs that were previously calculated, as they may have changed.
- The "Search Cards…" option allows you to search all the visible text displayed on plugin cards, so the results may be affected by any filters you have active. Searching can optionally be done using case-insensitive Perl-like regular expressions instead of case-insensitive text comparison.

4.2 The Toolbar

The toolbar provides access to LOOT's main features: selecting a game, sorting plugins and updating the masterlist. These features get disabled while the metadata editor is open, so if you're trying to use an option that is faded out, first close the editor.

4.2.1 Game Menu

LOOT's active game can be changed by clicking on it in the header bar, and selecting another game from the menu that is displayed. Games that have no install detected have their menu items disabled.

4.2.2 Masterlist Update & Sorting

The masterlist update process updates the active game's masterlist to the latest revision at the location given by the game's masterlist repository settings.

By *default*, sorting first updates the masterlist. LOOT then calculates a load order for your plugins, using their internal data and any metadata they may have. If a cyclic interaction is detected (eg. A depends on B depends on A), then sorting will fail.

Once LOOT has calculated a load order, it is compared with the current load order. If the current and calculated load orders are identical, LOOT will inform you that no changes were made via a status bar notification. If the calculated load order contains changes, the plugin cards are sorted into that order and the masterlist update and sorting buttons are replaced with Apply Sorted Load Order and Discard Sorted Load Order buttons, which apply and discard the calculated load order respectively. Changing games is disabled until the calculated load order is applied or discarded.

LOOT is able to sort plugins ghosted by Wrye Bash, and can extract Bash Tags and version numbers from plugin descriptions. Provided that they have the `Filter` Bash Tag present in their description, LOOT can recognise filter patches and so avoid displaying unnecessary error messages for any of their masters that may be missing.

Any errors encountered during sorting or masterlist update will be displayed on the "General Information" card.

Load Order Backups

Before a sorted load order is applied, LOOT saves a backup of the current load order as a `loadorder.bak.0` text file in LOOT's data folder for the current game. Up to three load order backups are retained: `loadorder.bak.0` is the backup from the most recent load order change, `loadorder.bak.1` is the second-most recent backup, and `loadorder.bak.2` is the third-most recent backup.

4.3 Plugin Cards & Sidebar Items

Each plugin is displayed on its own "card", which displays all the information LOOT has for that plugin, and provides access to plugin-specific functionality, including editing its metadata. Each plugin also has an item in the sidebar's Plugins section. The sidebar item contains the plugin's listed position, name and an icon for plugins that have user metadata. It also displays the plugin's in-game load order index if the plugin is active, while light plugins have their light plugin index displayed. Clicking on a plugin's sidebar item will select it, so that the Plugin menu options operate on it. Double-clicking a plugin's sidebar item will jump to its card.

The plugin card's header holds the following information, some of which is only displayed if applicable:

- The "Active Plugin" icon.
- The plugin name.
- The plugin's version number, extracted from its description field.
- The plugin's CRC (Cyclic Redundancy Checksum), which can be used to uniquely identify it. CRCs are only displayed after they have been calculated during overlap filtering or sorting, except the the CRC of the game's main master plugin, which is never displayed.
- The "Master Plugin" icon.
- The "Light Plugin" icon.
- The "Empty Plugin" icon.
- The "Loads Archive" icon.
- The "Verified clean" icon.
- The "Has User Metadata" icon.

Messages, Bash Tag suggestions and plugin sources are displayed below the plugin card's header.

LOOT's plugin messages are a valuable resource, as they provide information that might not be obvious. It is important for a stable, healthy game that you act on any messages that require action. If you think a message suggests an unnecessary action, report it to an official LOOT thread. If you encounter a message that is non-conditional, ie. it suggests an action but is still displayed on subsequent runs of LOOT after the action has been carried out, also report it to an official LOOT thread, so that it can be made conditional.

You generally don't need to do anything with Bash Tag suggestions, so they're hidden by default. If you're using Wrye Bash it will automatically apply LOOT's suggestions, and if you're not using Wrye Bash then this information doesn't apply.

Plugin sources are obtained from location metadata, and don't necessarily reflect where you downloaded the plugin from. If multiple mods provide a plugin with the same filename, that plugin may be listed with links to where each of those mods are hosted.

4.4 Filters

Clicking the Filters section header in the sidebar will replace the sidebar's plugin list with a list of filter toggles that can be applied to hide various combinations of plugins and other content. The available filter toggles are:

Hide version numbers
Hides the version numbers displayed in blue next to those plugins that provide them.

Hide CRCs
Hides the CRCs displayed in orange next to those plugins that provide them.

Hide Bash Tags
Hides all Bash Tag suggestions.

Hide Sources
Hides all plugin sources.

Hide notes
Hides all plugin messages that have the Note: prefix, or the equivalent text for the language selected in LOOT's settings.

Hide official plugins' cleaning messages
Hides all plugin cleaning messages for the current game's official plugins.

Hide all plugin messages
Hides all plugin messages.

Hide inactive plugins
Hides all plugins that are inactive.

Hide messageless plugins
Hides all plugins that have no visible messages.

Hide Creation Club plugins
Hides all plugins that are available through Bethesda's Creation Club.

Show only warnings and errors
Combines the Bash Tags, sources, notes and messageless plugins filters. Enabling it enables those other filters, and disabling any of those other filters will also disable it.

The filter toggles have their states saved on quitting LOOT, and they are restored when LOOT is next launched. There are also three other filters in the sidebar tab:

Show only overlapping plugins for
This filters the plugin cards displayed so that only plugins which modify the same game data records with this plugin will be visible. If this plugin loads an archive, other plugins that load archives which contain resources with the same file paths are also displayed. Sorting with the overlap filter active will first deactivate it.

Show only plugins in group
This filters the plugin cards displayed so that only plugins in the selected group will be visible.

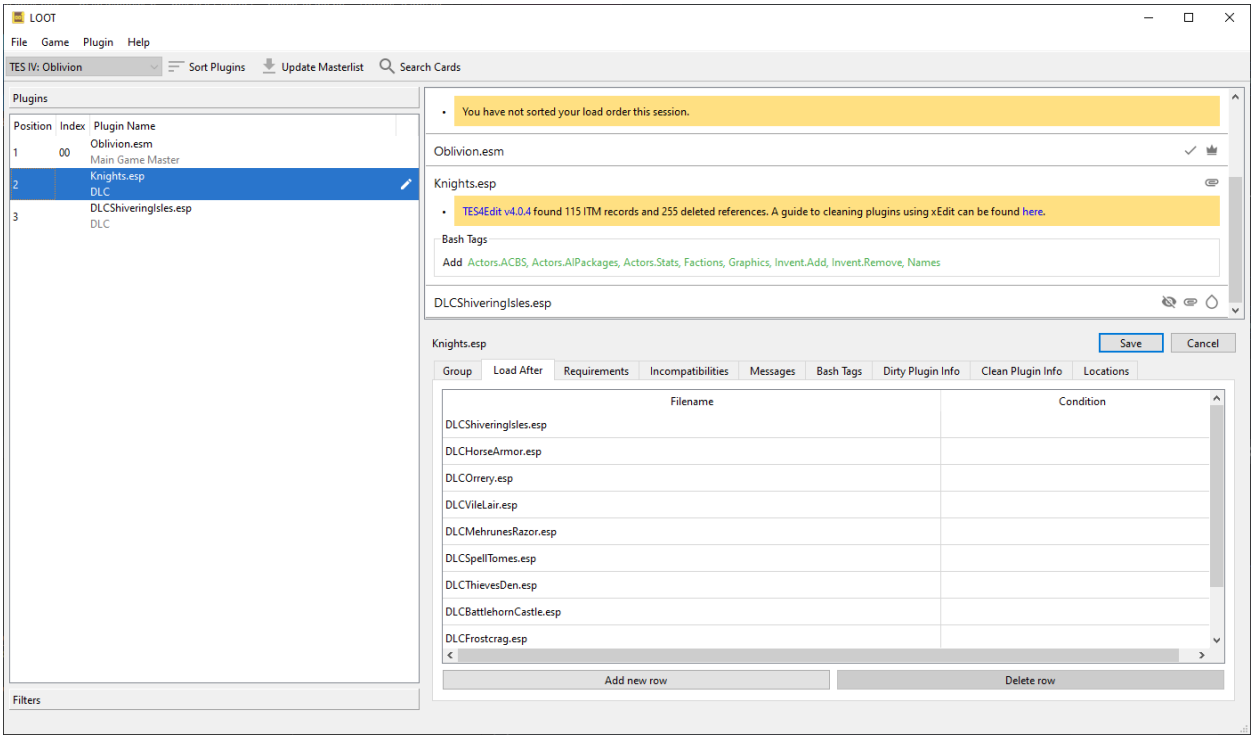
Show only plugins with cards that contain
This hides any plugins that don't have the filter input value present in any of the text on their cards.

The "Use regular expression" checkbox controls whether the input value is interpreted as text or as a regular expression. If ticked and the input value is not a valid regular expression, a tooltip detailing the issue will be displayed and the card content filter will be ignored.

CHAPTER

FIVE

EDITING PLUGIN METADATA



LOOT uses metadata to supply plugins with messages and Bash Tag suggestions, and to help it sort plugins that it can't otherwise sort correctly. You can add to your installed plugins' metadata through the metadata editor panel, and plugins with user metadata are indicated with a "Has User Metadata" icon.

The editor panel is accessed by selecting a plugin in the sidebar and then clicking the "Edit Metadata" item in the Plugin menu. Only one plugin's metadata can be edited at a time. While the editor panel is open, the plugin sidebar also displays any non-default plugin groups, to aid setting new group memberships. The editor can be resized by grabbing the top of the editor's header and dragging it up or down.

The editor's header displays the name of the plugin being edited, "Save" and "Cancel" buttons, and a row of tabs.

The Group tab's page contains the "Group" dropdown, which sets the group that the plugin belongs to, and is set to the "default" group by default.

> Plugin groups are used to concisely load groups of plugins after others. The dropdown lists all defined groups: to define new groups or edit existing groups, use the Groups Editor.

The other tab pages contain metadata tables, which are detailed below. New rows can be added, and existing user-added rows can be removed, though rows containing metadata from the masterlist or from plugins cannot. Such non-user

metadata rows are greyed out to indicate that they are not editable. The Load After, Requirements and Incompatibilities tables can have rows added by dragging and dropping plugins from the sidebar into the table area.

Load After
This is a list of plugins which, if present, the current plugin must load after, but which are not required. This metadata can be used for resolving specific compatibility issues. Each entry has two fields:

- The filename is the path, relative to the game's plugins folder (usually `Data`), of the file to be checked for. This field is required. It gives the filenames of installed plugins as autocomplete suggestions.
- The condition is the optional condition string that is used to determine if the file should be checked for. If left blank, the file will always be checked for. Condition strings are a relatively advanced part of LOOT's functionality, and their syntax is covered in the Metadata Syntax documentation.

Requirements
This is a list of files that are required by the current plugin for it to function correctly. The current plugin will be loaded after any plugins listed. LOOT will also display an error message if any of the listed files are missing. Any file, not just plugins, can be listed here. Each entry has the same fields as for the load after table and two additional fields:

- The display name is optional, and if specified will be used instead of the filename in any error messages that are displayed if a problem is encountered relating to the file.
- The detail field takes a list of localisable message texts that will be appended to the error message if one is displayed.

Note that listing a plugin's masters as requirements is unnecessary, as LOOT already checks them.

Incompatibilities
This is a list of files that are incompatible with the plugin. LOOT will display an error message if any of the listed files are found. Any file, not just plugins, can be listed here, and each entry has the same fields as for the requirements table.

Messages
A list of messages that are to be displayed for the plugin in LOOT's report. These have no bearing on a plugin's position in the load order. Each message has three fields:

- The type is fairly self-explanatory, and is used to provide messages of varying severity with appropriate emphasis in LOOT's report.
- The content is the localisable message text.
- The condition is, like for the corresponding file field, used to determine if the message should be displayed. If left blank, the message is displayed.

Bash Tags
A list of Bash Tags. These are used by Wrye Bash when generating a Bashed Patch, and are detailed in Wrye Bash's readme. LOOT's metadata includes Bash Tag addition and removal suggestions, and any Bash Tags that came with the plugin are also displayed.

As LOOT can suggest Bash Tags be added or removed, it is possible for the same Tag to appear twice, being suggested for addition and removal. In such cases, removal overrides addition.

Each Bash Tag has three fields:

- The add/remove field determines whether the Tag is to be suggested for addition or removal.
- The Bash Tag field is the actual Bash Tag name. The field gives autocomplete suggestions for Bash Tags that LOOT knows are supported for the current game.
- The condition decides if the Tag is to be suggested or not. It functions as for files and messages.

If a plugin's masters are missing, an error message will be displayed for it. Filter patches are special mods designed for use with a Bashed Patch that do not require all their masters to be present, and so any plugin with the Filter tag applied and missing masters will not cause any errors to be displayed.

Dirty Plugin Info

A list of dirty plugin CRCs and related information. Each row has six fields:

- The CRC of the dirty plugin.
- The ITM Count for the dirty plugin.
- The number of Deleted References that the dirty plugin contains.
- The number of Deleted Navmeshes that the dirty plugin contains.
- The name of the Cleaning Utility to use to clean the dirty plugin.
- A localisable detail message text.

LOOT uses the information supplied to construct a warning message for the plugin if it matches any of the given CRCs.

Clean Plugin Info

A list of clean plugin CRCs and the utility they were verified clean by. Each row has two fields:

- The CRC of the clean plugin.
- The name of the Cleaning Utility to use to verify that the plugin is clean.

LOOT uses the information supplied to display an icon on the plugin's card if it matches any of the given CRCs.

Locations

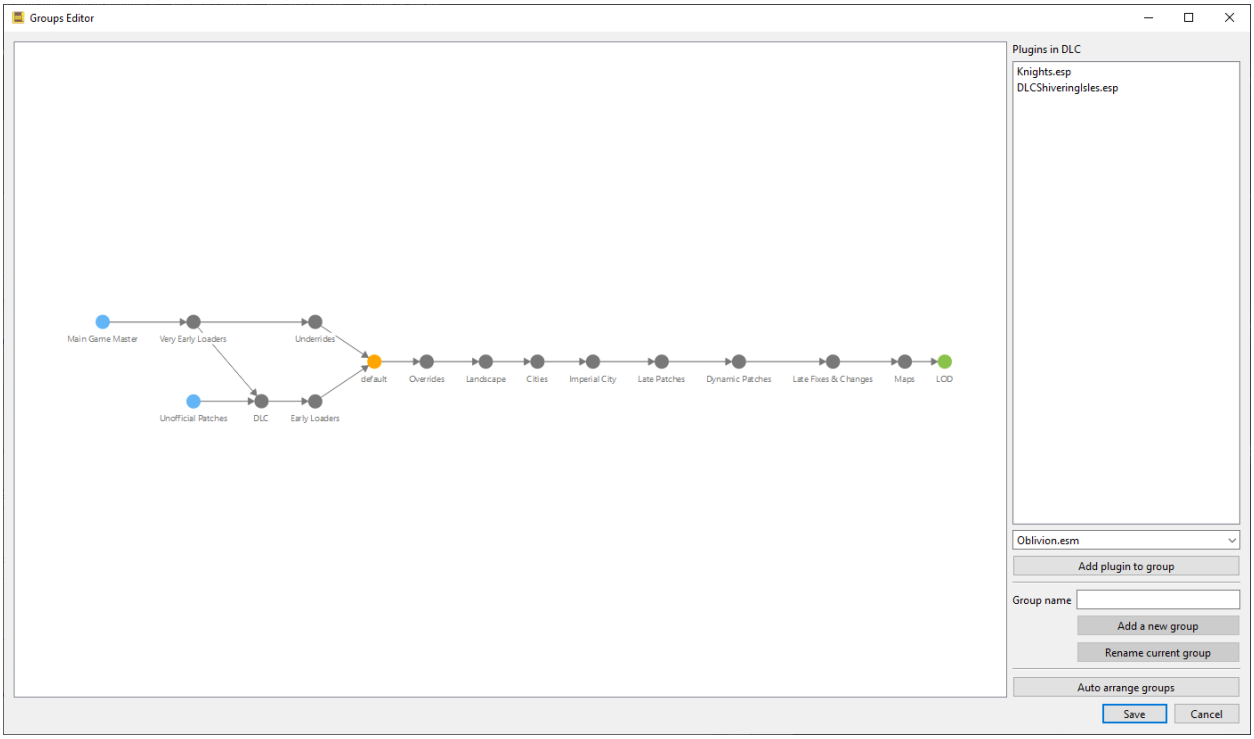
A list of URLs that the mod to which the plugin belongs can be found at. LOOT displays these as source hyperlinks on the plugin's card. Each location has two fields:

- The URL at which the plugin's parent mod can be found.
- The Name you wish to give the URL. If given, LOOT uses this as the text displayed for the hyperlink on the plugin's card.

CHAPTER

SIX

EDITING PLUGIN GROUPS



6.1 What Are Plugin Groups?

LOOT assigns each plugin to one plugin group, with plugins belonging to the `default` group by default. Each group has a name and a list of zero or more other groups it loads after. In this way, it's possible to concisely load groups of plugins after other groups of plugins.

Group load order is transitive, i.e. given three groups A, B and C, if C loads after B and B loads after A, then plugins in group C will load after plugins in group A even if no plugins in group B are installed.

6.2 The Groups Editor

A group must be defined before plugins can belong to it, and defining and editing groups is done in the Groups Editor, which can be accessed through the Game menu.

The groups editor consists of an interactive graph displaying all defined groups and their load after metadata, and a sidebar containing input for defining new groups, renaming the currently selected group, a list of plugins in the currently selected group and a dropdown combo box for adding plugins to the currently selected group.

- Groups are displayed as circular nodes in the graph, labelled with their names.
  - Groups that load after no other groups are displayed in blue.
  - Groups that no other groups load after are displayed in green.
  - The `default` group is displayed in orange.
- Load after metadata is displayed as lines (edges/vertices) between nodes, pointing from the earlier group to the later group.
- Metadata defined in the masterlist is greyed out, while user-defined metadata is not.

If any group definitions reference another group that does not exist, the groups editor will create the missing group as user metadata. This is to help when there is user metadata that says the user-defined group B must load after the masterlist-defined group A, but then group A is removed in a masterlist update. In that case, just open up the groups editor and link group A back into the graph as it was before.

New load after metadata can be added by double-clicking on one group node and dragging a line from it to any other group nodes.

Clicking on a group will cause any installed plugins in that group to be listed in the sidebar. Right-clicking the list will display a context menu that contains an action to copy the listed plugin names to the clipboard.

Right-clicking a load after metadata line will remove that load after metadata, and right-clicking a group will remove it. Masterlist metadata cannot be removed. A group cannot be removed if any installed plugins belong to it.

The graph can be zoomed in and out of using your mouse's scroll wheel. Left-clicking and dragging an empty space will move the whole graph, while left-clicking and dragging a node will move it.

6.3 Rules For Using Groups

The groups editor enforces a few rules:

- A group cannot load after itself.
- A group cannot load after another group if the other group does not exist.
- It's not possible to delete groups that are defined in the masterlist.
- It's not possible to remove 'load after' entries from a group if they were defined in the masterlist.

Another rule that the groups editor cannot enforce is that **group metadata must not introduce cycles**. A simple example of cyclic groups is where group `B` loads after group `A`, and group `A` loads after group `B`.

A more complex example involving other types of metadata is where

- `A.esp` is in the `early` group
- `B.esp` is in the `mid` group
- `C.esp` is in the `late` group
- `A.esp` has `C.esp` as a master

- The `late` group loads after the `mid` group, which loads after the `early` group.

This will cause a cyclic interaction error when sorting, because the groups say that the load order should be

1. `A.esp`
2. `B.esp`
3. `C.esp`

but `A.esp` must load after `C.esp` to satisfy its dependency.

6.4 Cycle Avoidance

Groups must not introduce cycles, but in practice this can be quite hard to ensure. LOOT helps by avoiding cycles that have an "obvious" solution.

- If group membership contradicts where a plugin's masters, master flag, load after or requirement metadata say that plugin should load relative to another plugin, the plugins' groups' relationship will not be enforced. For example, if:
  - `dependent.esp` belongs to group `early`
  - `master.esp` belongs to group `late`
  - `master.esp` is a master of `dependent.esp`
  - The `late` group loads after the `early` group.

  `dependent.esp` must load after `master.esp` due to the former being a master of the latter, but their groups suggest that `master.esp` must load after `dependent.esp`, so the group metadata is ignored for that pair of plugins.
- In addition, if one of a pair of plugins with contradictory groups is the `default` group, that plugin will also have its group metadata ignored for all plugins in all groups that load between `default` and the other plugin's group.

  For example, if:
  - `A.esp` is in the `default` group
  - `B.esp` is in the `mid` group
  - `C.esp` is in the `late` group
  - `A.esp` has `C.esp` as a master
  - The `late` group loads after the `mid` group, which loads after the `default` group.

  This will not cause a cycle, as:
  - `A.esp`'s group is ignored for `C.esp` as their groups contradict `C.esp` being a master of `A.esp`
  - `A.esp`'s group is ignored for `B.esp` as `B.esp` is in the `mid` group, which loads between `default` and `late`.

  The sorted load order is therefore:
  1. `B.esp`
  2. `C.esp`
  3. `A.esp`

  This is very similar to the example given in the previous section which *did* cause a cycle: the only difference is that the `early` group is now `default`.

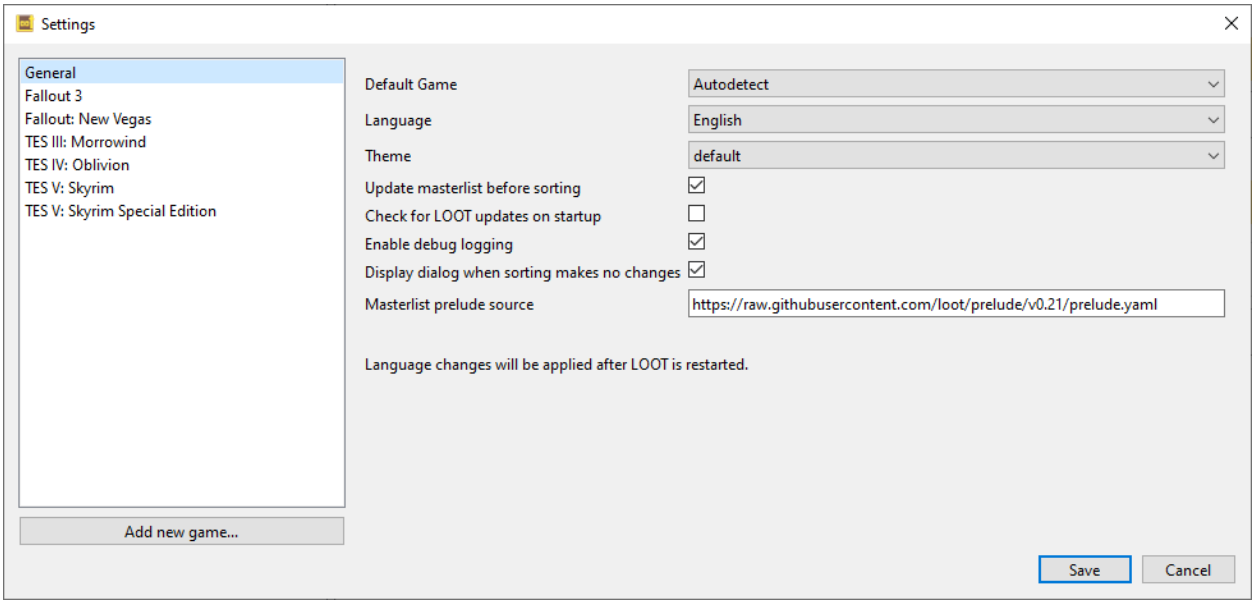
CHAPTER

SEVEN

EDITING SETTINGS

LOOT's settings may be accessed through the File menu.

7.1 General Settings



Default Game
: If set to something other than Autodetect, this overrides game autodetection. If the game specified is not detected, LOOT falls back to autodetection.

Language
: Controls the language LOOT uses. Any plugin messages that do not have translations in the selected language will be displayed in English, if available, or in their available language otherwise.

Theme
: Controls the theme LOOT loads. If the specified theme is not found, LOOT falls back to the default theme.

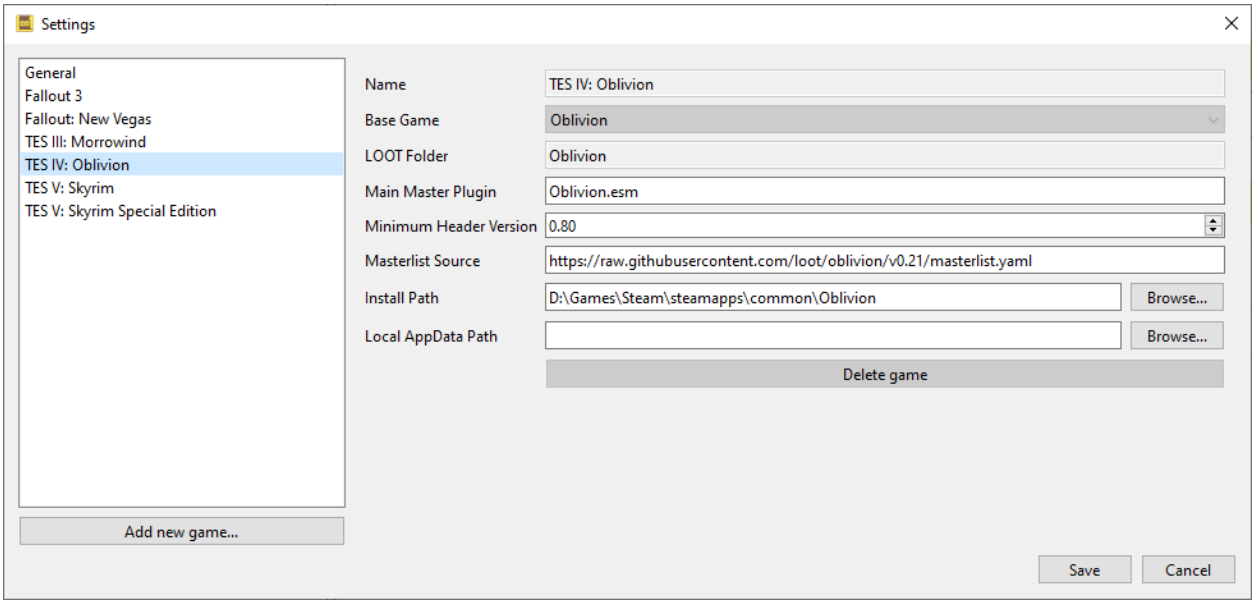
Update masterlist before sorting
: If checked, LOOT will update its masterlist, should an update be available, before sorting plugins.

Check for LOOT updates on startup
: If checked, LOOT will check for updates on startup and display a general message if an update is available.

Enable Debug Logging
: If enabled, writes debug output to `%LOCALAPPDATA%\LOOT\LOOTDebugLog.txt`. Debug logging can have a noticeable impact on performance, so it is off by default.

Masterlist prelude source
: The URL of a masterlist prelude file that LOOT uses to update its local copy of the masterlist prelude.

7.2 Game Settings



LOOT's game-specific settings can be customised by selecting a game in the sidebar. New game profiles can be added, making it easy to use LOOT across multiple copies of a game, including total conversion mods. Game profiles can also be deleted, though the active game cannot have its profile deleted, and LOOT will recreate default profiles for any games it detects when it is next run.

Name
: The name of the game, or another identifying text, that is displayed in menus and the LOOT's title bar.

Base Game
: Every game LOOT runs for must use the plugin file format and load order system of one of the following games:

- Starfield
- TES III: Morrowind
- TES IV: Oblivion
- TES V: Skyrim
- TES V: Skyrim Special Edition
- TES V: Skyrim VR
- Fallout 3
- Fallout: New Vegas
- Fallout 4
- Fallout 4 VR

LOOT Folder
The sub-folder which LOOT uses to store the game's files in. Each game must be given a unique sub-folder.

Main Master Plugin
The game's main master plugin. This is checked for when detecting if the game is installed.

Minimum Header Version
LOOT will display a warning message for any plugin that has a header version less than this value. Note that this version is different from any version that LOOT may be able to read from the plugin's description field.

Masterlist Source
The URL of a masterlist file that LOOT uses to update its local copy of the masterlist.

Install Path
The path to the game's folder, in which the games executable and plugins folder (usually `Data`) are found.

Local AppData Path
The path to the game's local application data directory, which is usually in `%LOCALAPPDATA%` and for most games contains `plugins.txt`. If left empty, LOOT will derive the path to use from the base game type.

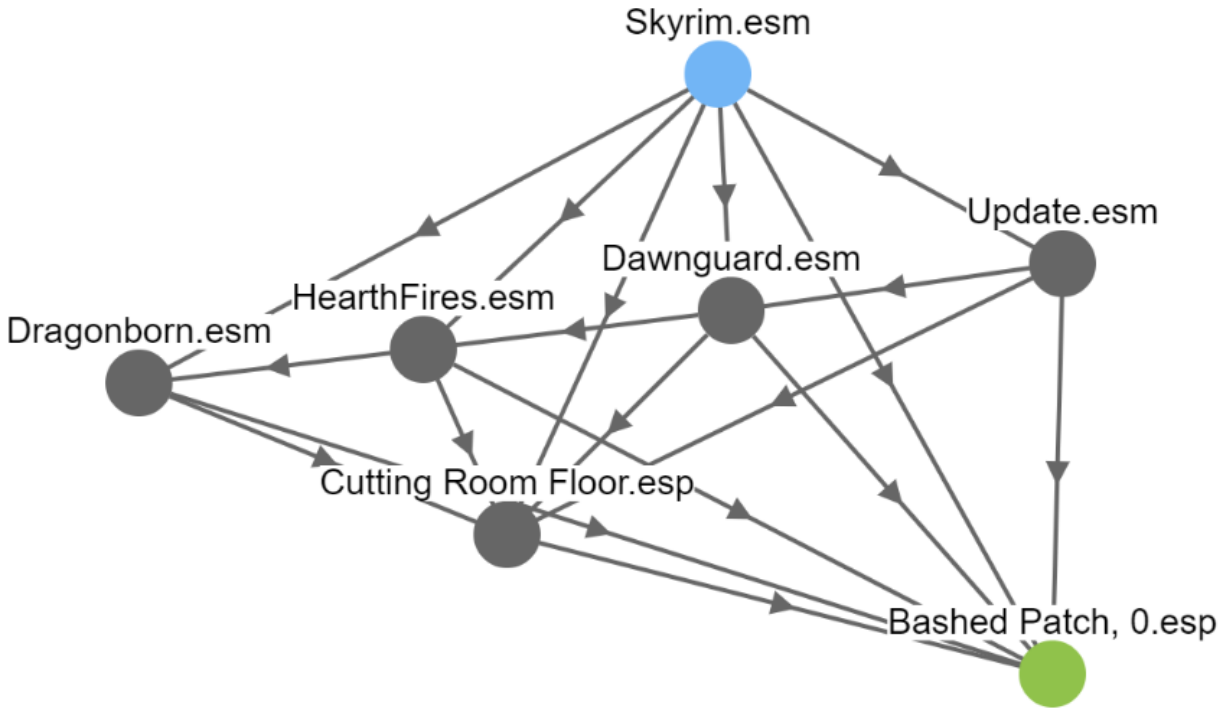
CHAPTER

EIGHT

HOW LOOT SORTS PLUGINS

LOOT sorts plugins according to a set of rules that dictate how two plugins load relative to one another. An example rule could be "`Cutting Room Floor.esp` must load after `Skyrim.esm`". LOOT derives rules from various data sources: one source for the example rule could be the plugins' master flag fields: `Skyrim.esm` has its master flag set, and `Cutting Room Floor.esp` does not. Another source could be the plugins' master fields: `Cutting Room Floor.esp` has `Skyrim.esm` as a master.

LOOT represents these rules in a graph, where each point (or *vertex*) represents a plugin, and each line (or *edge*) joins two points, going from the plugin that loads earlier to the plugin that loads later. Visualised, a simple set of rules on a small load order looks like this:



It may seem like there are a lot of edges in that image, but a real load order graph can contain thousands of vertices and over a hundred thousand edges.

To improve performance, LOOT actually sorts using two graphs: one for master-flagged plugins and one for the other plugins, and then appends the latter's sorted order to the former's sorted order to give the complete sorted load order. The two graphs are sorted the same way, so the information below applies to both, and the result is the same as if a single graph was used.

8.1 Building The Plugin Graph

The plugin graph is constructed in a specific way, partly to ensure that sorting doesn't give you different results every time.

8.1.1 Hard Rules

First the 'hard' rules, which **must** be followed, are applied. For each plugin, going in lexicographical (like alphabetical, but extended to cover digits and other symbols) order:

1. If the plugin has its master flag set, edges are added going from it to every other plugin that does not have its master flag set. Note that because plugins are partitioned into separate graphs by their master flag, this doesn't add any edges, but it's kept for completeness.
2. If the plugin has any masters, edges are added going from each of them to the plugin.
3. If the plugin has any requirements metadata, edges are added going from each required plugin to the plugin.
4. If the plugin has any "load after" metadata, edges are added going from each "load after" plugin to the plugin.

Some games, like the various versions of Skyrim and Fallout 4, hardcode the positions of some plugins. To take this into account when sorting, LOOT adds hard rules for them. For each plugin that has a hardcoded position, going from the first/earliest hardcoded position to the last/latest position, an edge is added between each consecutive plugin to enforce that order, and then edges are added from the last hardcoded plugin going to every non-hardcoded plugin.

In the example graph image above, all the edges apart from the one between `Cutting Room Floor.esp` and `Bashed Patch, 0.esp` could be due to hard rules:

- `Skyrim.esm` is a master of all the other plugins.
- `Skyrim.esm`, `Update.esm`, `Dawnguard.esm`, `HearthFires.esm` and `Dragonborn.esm` are all hardcoded to load in that order.
- All of the `*.esm` plugins have their master flag set, and both of the `*.esp` plugins do not have it set.

8.1.2 Group Rules

At this point, all hard rules have been applied. Group rules are applied next. This part has the most complex logic, though the ideas behind it are relatively simple. To summarise, each plugin belongs to a group, and groups can load after other groups. If group C loads after group B, and group B loads after group A, this means that all the plugins in group C load after all the plugins in groups A and B.

However, group rules are 'soft' rules, so can be ignored to avoid cyclic interactions. A cyclic interaction occurs when following the rules results in a load order that loops back on itself, e.g. the two rules "B loads after A" and "A loads after B" are cyclic. If one of those rules is a hard rule and the other is a group rule, LOOT will ignore the group rule to avoid the cycle. There are also a few other cases in which LOOT can avoid a cycle involving group rules, which are detailed in *Editing Plugin Groups*.

It's not always possible for LOOT to choose which plugin's group metadata to ignore, and it's often impractical to know all of the hard and group rules that a plugin may be involved in, so plugin grouping is a relatively common source of cyclic interaction errors.

Anyway, after applying all the hard rules, LOOT applies all the group rules it can for each plugin in lexicographical order, avoiding cycles by ignoring those groups that it needs to.

In the example graph image above, the edge from `Cutting Room Floor.esp` to `Bashed Patch, 0.esp` is due to a group rule, because `Bashed Patch, 0.esp` is in a group that loads after `Cutting Room Floor.esp`'s group.

8.1.3 Overlap Rules

Overlap rules are applied after group rules, and have lower priority. They are also soft rules, and are ignored as necessary to avoid cyclic interactions. Two plugins are said to overlap if they both contain a copy of a record, or if they both load one or more BSAs (or BA2s for Fallout 4) and the BSAs loaded by one plugin contain data for a file path that is also included in the BSAs loaded by the other plugin. They don't necessarily have to make any edits to a record for there to be an overlap, it just needs to be in both plugins. Similarly, the assets loaded by the two plugins could be identical or completely different, it's only the presence of the file path that matters.

If two plugins' records overlap, and one overrides more records than the other, then the rule is to load the plugin that overrides fewer records after the other plugin. Otherwise, if the two plugins' loaded assets overlap, the plugin that loads more assets loads first. This is done to help maximise the effect that each plugin has. If the two plugins override the same number of records and load the same number of assets, the overlap is ignored and no rule exists.

Each pair of plugins is checked in lexicographical order for overlap, and all overlap rules are applied, unless adding a rule would cause a cycle.

Morrowind plugins that have one or more masters that are not installed have their total record count used in place of their override record count, as unlike for other games, a Morrowind plugin's override records can only be counted by comparing the plugin against its masters. Morrowind plugins also can't load BSAs, so they can't have overlapping assets.

8.1.4 Tie Breaks

At this point LOOT might be ready to calculate a load order from the graph, but to ensure a consistent result, it needs to make sure there is only one possible path through the graph that visits every plugin. For example, going back to the image above, if there was no edge between `Cutting Room Floor.esp` and `Bashed Patch, 0.esp`, the load order could be:

```
Skyrim.esm
...
Cutting Room Floor.esp
Bashed Patch, 0.esp
```

or it could be:

```
Skyrim.esm
...
Bashed Patch, 0.esp
Cutting Room Floor.esp
```

as there would be no way to decide which plugin to put last. This could mean that LOOT's sorting would be inconsistent, maybe picking a different result each time, which wouldn't be good.

To avoid this, LOOT first sorts the plugins into their current load order:

- If both plugins have positions in the current load order, the function preserves their existing relative order.
- If one plugin has a position and the other does not, the plugin with a position goes before the plugin without a position.
- If neither plugin has a load order position, a case-insensitive lexicographical comparison of their filenames without file extensions is used to decide their order. If they are equal, a case-insensitive lexicographical comparison of their file extensions is used.

Once sorted, LOOT tries to add an edge between each consecutive pair of plugins, in an attempt to enforce the current load order.

- If adding the edge would cause a cycle, then the LOOT loops through each plugin in the existing path between the pair of plugins and pins its position relative to the plugins that have already been processed, before continuing with the next pair of plugins.
- If adding the edge wouldn't cause a cycle but the first plugin of the pair has already had its position pinned, then the second plugin of the pair has its position pinned too.
- Otherwise, the edge is simply added.

Here's a diagram showing plugins A, B, C, D and E, with that being their current load order. Sorting has already added edges between (C, E) and (D, E) that contradict the current load order:

8.2 Topological Sort

At this point the plugin graph is now complete. Before calculating a load order from the graph, the graph is checked for cycles: if one is found, a sorting error occurs. If no cycles are found, then the graph is topologically sorted, which produces a path through the graph's vertices that visits each vertex exactly once. This path is the calculated load order.

The topological sort of the example graph is:

```
Skyrim.esm
Update.esm
Dawnguard.esm
HearthFires.esm
Dragonborn.esm
Cutting Room Floor.esp
Bashed Patch, 0.esp
```

CHAPTER

NINE

THEMES

Themes can be selected in LOOT's settings dialog. Two themes are provided with LOOT: the default theme and a dark theme.

If you're running LOOT on Linux with a dark system theme, then depending on your system configuration you may get better results with LOOT's default theme than with its dark theme.

Additional themes may be installed in the `themes` directory in LOOT's application data directory (at `%LOCALAPPDATA%\LOOT` on Windows). A theme is defined by a single `<theme name>.theme.qss` Qt Style Sheet file.

CHAPTER

TEN

CONTRIBUTING & SUPPORT

LOOT is very much a community project, and contributions from its users are very welcome, whether they be metadata, translations, code or anything else. The best way to contribute is to make changes yourself at GitHub! It's the fastest way to get changes you want applied, and you'll get your name automatically immortalised in our credits.

If you encounter an issue with LOOT, check the Frequently Asked Questions page in case a solution is available there. Otherwise, general discussion and support takes place in LOOT's official forum thread or on our Discord server, which are also linked to on LOOT's homepage.

If you want to submit metadata, the easiest way to do so is to add the metadata to your own LOOT install, then use the Copy Metadata feature to easily get it in a form that you can then edit into a masterlist on GitHub or post in the official forum thread.

Information on dirty plugins is very welcome in the form of QAC (Quick Auto Clean) reports from xEdit. In addition to the QAC report we also require a link to a plugins source, so we can always verify and reevaluate the plugin at a later date. Please also check if the masterlist already includes information on the plugin in question.

For safety and usability, links to mods must follow these guidelines:

- The link should refer to an official/canonical/supported source, as opposed to unverified uploads.
- Whenever possible, the url should use `https` instead of `http`.
- The plugin in question mustn't be behind a paywall of any sort.
- The LOOT Team reserves the right to reject URLs to websites that contain illegal content.

CHAPTER

ELEVEN

CREDITS

LOOT is developed on GitHub, and a full list of GitHub contributors may be found here.

LOOT's masterlists have gotten many additions, improvements, refinements and translations over the years, and so credit is due to the very large number of people and sources (particularly BOSS's masterlists) who have contributed to them.

In addition, the following are credited with application-related support:

- Original icon: jonwd7
- Translations:
  - Bulgarian: Georgi Georgiev
  - Chinese (Simplified): bluesky404, silentdark
  - Czech: ThePotatoChronicler
  - Danish: Freso, ZyPA
  - Finnish: 3ventic
  - French: Kaos, cpasmoi, Sita, Zamix, Simple Shawn
  - German: lpradel, DaCoolX, Infernio, pStyl3
  - Italian: Griam, nicola89b, albie
  - Japanese: kuroko, tktk11, Menchi
  - Korean: SteamB23, sean-kang
  - Polish: Łukasz Niemczyk, Yoosk, alemisiu
  - Portuguese: ironmagician
  - Portuguese (Brazil): Kassane, zDasF1xer, Kyo– (Carlos Gabriel), Hollow_666
  - Russian: Tokc.D.K., Kerber, IllusiveMan196, xsSplater
  - Spanish: Sharlikran, Artaios, Mr. Robo, Allen1351 (Ale)
  - Swedish: Mikael Hiort af Ornäs, simoneddeland, ddbb07
  - Ukrainian: IllusiveMan196
- Testing: Too many to list, thank you all!

LOOT uses the Boost, spdlog, toml++ and ValveFileVDF libraries and the OGDF and Qt frameworks.

CHAPTER

TWELVE

VERSION HISTORY

Only application history is recorded here. A full history of masterlist changes may be viewed by browsing the GitHub repositories.

12.1 0.22.3 - 2023-12-06

12.1.1 Fixed

- LOOT no longer displays an error for Skyrim Special Edition light plugins that have a header version of 1.71 or greater and which contain records with object IDs less than `0x800`. Such plugins were introduced with Skyrim Special Edition v1.6.1130.0. Via libloot.
- LOOT will now display an error for Fallout 4 light plugins that have a header version less than 1.0 and which contain records with object IDs less than `0x800`. Via libloot.

12.1.2 Changed

- Updated libloot to v0.22.3.

12.2 0.22.2 - 2023-12-01

12.2.1 Fixed

- LOOT could error when reading the load order if it encountered a game ini file containing single or double quote or backslash characters, as it attempted to treat them as special characters. Via libloot.

12.2.2 Changed

- Updated libloot to v0.22.2.

12.3 0.22.1 - 2023-11-05

12.3.1 Fixed

- The "Hide Creation Club plugins" filter had no effect on Linux.

12.3.2 Changed

- Sorting has been disabled for Starfield. Due to the way that Starfield plugins make changes to existing data, LOOT cannot reliable detect when two plugins change the same record, so sorting may not function as intended.
- The new plugin type and plugin header flag introduced by Starfield that was previously referred to as the "override" plugin type and flag is now referred to as the "overlay" plugin type and flag for consistency with xEdit, Wrye Bash and Mod Organizer 2.
- The "Show only conflicting plugins for" filter has been renamed to "Show only overlapping plugins for" for clarity and consistency with other LOOT functionality.

12.4 0.22.0 - 2023-10-07

12.4.1 Added

- Support for Starfield.
- LOOT will now display a warning if it detects that a Starfield plugin has the override flag set and also adds new records.

12.4.2 Fixed

- LOOT could crash during startup if game detection encountered an error.
- LOOT could crash if updating all masterlists encountered an error, and an error could be encountered depending on how fast each masterlist was updated.
- Detection of Epic Games Store games installed using Heroic Games Launcher on Linux would cause LOOT to use the wrong local app data paths for Skyrim Special Edition and Fallout: New Vegas.
- High CPU usage when idle, which was accidentally introduced in LOOT v0.21.0.
- The installer now includes copies of masterlists for Nehrim, Enderal and Enderal Special Edition.
- The uninstaller did not remove non-default LOOT game folders or empty folders in LOOT's install path.
- Only lowercase plugin file extensions were recognised as plugin file extensions when evaluating conditions. Via libloot.
- Fallout: New Vegas plugins with corresponding `.nam` files are now identified as being active. Via libloot.
- Plugins activated using the `sTestFile1` through `sTestFile10` ini file properties are now recognised as being active for all games other than Morrowind, which does not support those properties. The properties are used by default in Fallout 3, Fallout: New Vegas and Skyrim Special Edition. Via libloot.
- Fallout 4's `Fallout4.ccc` and `plugins.txt` and Fallout 4 VR's `plugins.txt` are now ignored when the game has plugins activated using the `sTestFile1` through `sTestFile10` ini file properties. Setting the load order still writes `plugins.txt` but now also sets the load order using plugin file timestamps. Via libloot.

- When deciding where to look for Oblivion's `plugins.txt`, the `bUseMyGamesDirectory` ini property is now correctly expected in the `[General]` section of `Oblivion.ini`, instead of anywhere in the file. Via libloot.
- When reading the load order, LOOT now orders plugins correctly when their order depends on their timestamps and two plugins have the same timestamp. LOOT used to sort them in ascending filename order: it now uses descending order for all games other than Starfield. Via libloot.
- When reading the load order for games that can have plugins with no defined load order position, LOOT now adds such plugins to the load order in ascending timestamp order rather than ascending filename order, matching the behaviour of all supported games, xEdit and Wrye Bash. Via libloot.
- LOOT no longer warns that Morrowind, Oblivion, Fallout 3 and Fallout New Vegas load orders are ambiguous if they have two plugins with the same timestamp. Via libloot.
- LOOT no longer requires that implicitly active plugins are listed in `plugins.txt` for a Skyrim SE, Skyrim VR, Fallout 4 or Fallout 4 VR load order to be unambiguous.
- Outdated screenshots in the documentation.

12.4.3 Changed

- It is now possible to edit a game's name in LOOT's settings.
- LOOT now checks if the load order is ambiguous after setting it (e.g. by applying a sorted load order or by trying to fix an ambiguous load order), and displays a warning dialog if it is ambiguous.
- LOOT will now copy the masterlist from the default LOOT folder for a game if it exists when initialising a different LOOT folder for the same game, so that the masterlist doesn't need to be re-downloaded to initialise LOOT for multiple installs of the same game.
- Updated metainfo XML to match Flathub listing.
- Updated installation page of the documentation to reflect that LOOT is available for Linux on Flathub.
- Updated the Brazilian Portuguese translation.
- Updated the Bulgarian translation.
- Updated the Finnish translation.
- Updated the German translation.
- Updated the Japanese translation.
- Updated the Ukrainian translation.
- Updated Boost to 1.83.0.
- Updated libloot to v0.22.1.
- Updated minizip-ng to v4.0.1.
- Updated OGDF to v2023.09.
- Updated Qt to v6.5.3.
- Updated toml++ to v3.3.0.
- Updated zlib to v1.3.

12.4.4 Removed

- Support for detecting Microsoft Store game installs from before February 2022.

12.5 0.21.0 - 2023-09-17

12.5.1 Added

- Support for the GOG distribution of Fallout 4.
- LOOT can now find Steam game installs by reading Steam configuration files.
- LOOT can now find GOG and Epic Games Store games installed using the Heroic Games Launcher.
- A "Hide official plugins' cleaning messages" filter.
- An "Update All Masterlists" action is now available in the File menu. It updates the masterlists for all configured games.
- An "Open FAQs" action is now available in the Help menu. It opens the LOOT FAQs webpage in the user's default browser.
- A "Copy Plugin Names" action is now available in a right-click context menu for the Groups Editor's group plugins list. The action copies the listed plugin names to the clipboard.
- LOOT will now display warning messages if the current game is installed to, or stores its local application data in, a case-sensitive filesystem path.
- A LOOT release is now available for Linux as a binary archive. This is intended as a step towards making LOOT releases available as a Flatpak application on Flathub, and is not recommended for general use as the archive does not include most of LOOT's runtime dependencies.

12.5.2 Fixed

- If LOOT v0.20.0 encountered errors during startup, it would fail to display the error messages correctly, instead displaying blank error messages.
- Since v0.19.0, LOOT could crash if an error was encountered while loading data for the current game.
- The styling of the general information and plugin cards would not update in response to application state changes (e.g. if inactive windows are styled to have grey text, the text would stay black whether or not the LOOT window was active).
- When running on Linux with some system configurations and a dark system theme, some of the text in LOOT's main window cards would be difficult to read due to having very low contrast. LOOT's default theme now adapts its colours if it detects that the system colour scheme is dark.
- When reading the list of active plugins for Oblivion, LOOT would look for a file named `plugins.txt`, which caused inaccurate results on case-sensitive filesystems, as Oblivion writes the file as `Plugins.txt`. Via libloot.
- Condition evaluation would only recognise plugin files as plugins if they had lowercase file extensions. Via libloot.

12.5.3 Changed

- LOOT now differentiates Nehrim from Oblivion, Enderal from Skyrim and Enderal Special Edition from Skyrim Special Edition in its settings. When updating from a previous version of LOOT, existing settings will be migrated: if a configured game is not installed, heuristics will be used to differentiate between settings for the total conversions and for the original games.
- The error messages displayed when LOOT cannot detect any game installs have been improved.
- LOOT now sorts games it detects by name.
- LOOT will no longer encounter an error when the game's local app data path does not exist. Via libloot.
- Theme files are now loaded from the `themes` folder in LOOT's data folder instead of the `themes` folder in LOOT's install folder.
- When running on Linux, the user's home directory path is now replaced with `$HOME` instead of `%USERPROFILE%` in log messages.
- When running on Linux, LOOT now uses `$XDG_DATA_HOME/LOOT` instead of `$XDG_CONFIG_HOME/LOOT` to store its data, and falls back to using `$HOME/.local/share/LOOT` instead of `$HOME/.config/LOOT`.
- LOOT now supports v0.21 of its metadata syntax. Via libloot.
- The default masterlist branch is now `v0.21`.
- The Light Plugin icon has been replaced.
- Updated Bulgarian translation.
- Updated Finnish translation.
- Updated French translation.
- Updated German translation.
- Updated Italian translation.
- Updated Ukrainian translation.
- Updated libloot to 0.21.0.
- Updated Qt to 6.5.2.
- Updated to ICU 71.1 on Linux.

12.5.4 Removed

- Copy to clipboard functionality on Linux no longer requires `xclip` to be installed.
- When running on Linux, LOOT no longer scans mount points for Microsoft Store game installs, as it wouldn't be able to correctly generate configuration for any games that it found.
- When running on Linux LOOT will no longer detect a game installed beside the LOOT install path, as LOOT cannot then find the game's local data path.

12.6 0.20.0 - 2023-06-10

12.6.1 Added

- Support for the GOG distributions of Nehrim and Enderal.
- Support for multiple instances of each supported game (e.g. from Steam, GOG, Epic Games Store, Microsoft Store). LOOT will now look for all instances of supported games and create a separate settings entry for each instance found.
- Support for the Microsoft Store's Fallout 4 DLC, which get installed outside of the Fallout 4 installation path.
- LOOT now displays warning messages for all games when too many plugins are active. Previously such messages were only displayed for Morrowind.
- LOOT now displays error messages explaining why a group cannot be removed in the Groups Editor instead of just doing nothing.
- The installer now includes the most recent masterlists and prelude at time of creation, and can optionally download all the latest masterlists and prelude when installing LOOT.
- The installer has been translated into Bulgarian, Italian and Ukrainian.

12.6.2 Fixed

- LOOT could crash on startup if it encountered an invalid `.GamingRoot` file when trying to detect Microsoft Store games.
- LOOT could error on startup if the Epic Games Launcher was not installed.
- Cyclic interaction error messages could include too many plugins in the cycles they displayed.
- LOOT allowed invalid folder names when adding a new game in the Settings dialog.
- Errors encountered during masterlist updates or the check for new LOOT updates would cause an internal error message to be displayed to the user. A generic error message is now displayed instead, matching how other errors are handled.
- Double-right-clicking on a group in the Groups Editor would prevent it from being moved.
- The sidebar plugins table text colour is now consistent across all columns when a row is selected but the sidebar does not have focus.

12.6.3 Changed

- LOOT no longer treats any active plugins as inactive if too many are active, as this could cause them to be deactivated unnecessarily when setting a sorted load order.
- Improved the warning messages displayed when there are too many active Morrowind plugins.
- If LOOT encounters an invalid `.GamingRoot` file, it now skips only that file instead of all remaining `.GamingRoot` files.
- Updated the Brazilian Portuguese translation.
- Updated the Bulgarian translation.
- Updated the Finnish translation.
- Updated the German translation.

- Updated the Italian translation.
- Updated the Japanese translation.
- Updated the Ukrainian translation.
- Updated the Polish installer translation.
- Updated Boost to 1.81.0.
- Updated libloot to 0.19.4.
- Updated Qt to 6.5.1.

12.6.4 Removed

- Support for Windows 7 and 8.1, and 32-bit Windows 10. LOOT now requires 64-bit Windows 10 or 11.

12.7 0.19.1 - 2023-01-14

12.7.1 Fixed

- The 0.19.0 release did not have the correct version number.

12.8 0.19.0 - 2023-01-14

12.8.1 Added

- Sorting now takes into account overlapping assets in BSAs/BA2s that are loaded by plugins. If two plugins don't make changes to the same record but load BSAs (or BA2s for Fallout 4) that contain data for the same asset path, the plugin that loads more assets will load first (unless that's contradicted by higher-priority data and metadata).
- It is now possible to add plugins to groups from within the groups editor.
- It is now possible to rename groups in the groups editor.

12.8.2 Fixed

- When the currently-selected group in the groups editor is removed, its information to the right of the dialog is now cleared.
- LOOT now limits itself to scanning fixed and RAM disk drives when searching for Microsoft Store games. LOOT would previously also scan other drives, like optical and floppy disk drives and network drives.
- If LOOT could not apply a sorted load order, the error message could give the wrong path to the file that the game uses to store the load order.

12.8.3 Changed

- Sorting is now significantly faster, with tests showing over 290 times the sorting speed of LOOT v0.18.6 with large load orders. Due to the changes, LOOT may sort unrelated plugins differently.
- Game data loading is now faster, with test showing a 40% improvement since LOOT v0.18.6.
- Changing LOOT's plugin data or active filters no longer resets the search dialog, instead the search results are updated to reflect the changes.
- Non-user metadata rows in the plugin metadata editor's tables are now greyed out to distinguish them from editable user metadata rows.
- Cyclic interaction errors now distinguish between group edges that involve user metadata and those that don't.
- `LOOT.exe` did not include some file info fields that are required according to Microsoft's documentation. The `CompanyName`, `FileDescription`, `InternalName`, `OriginalFilename` and `ProductName` fields have been added.
- Translatable text now consistently uses C++20-style formatting replacement fields (e.g. `{0}`, `{1}`).
- LOOT now includes informational messages in its log when debug logging is disabled.
- Updated the Bulgarian translation.
- Updated the Chinese translation.
- Updated the Finnish translation.
- Updated the German translation.
- Updated the Italian translation.
- Updated the Japanese translation.
- Updated the Ukrainian translation.
- Updated libloot to v0.19.2.
- Updated Qt to 6.4.2.
- Updated spdlog to v1.11.0.
- Updated zlib to 1.2.13.
- Updated minizip-ng to 3.0.8.
- Updated tomlplusplus to 3.2.0.
- Linux builds are now built using GCC 10 and now link against the `tbb` library.

12.9 0.18.6 - 2022-10-22

12.9.1 Added

- Built-in support for the Epic Games Store distributions of Skyrim Special Edition and Fallout 3.

12.9.2 Changed

- Improved game detection for game installs that have localisations installed in side-by-side subfolders (e.g. the Epic Games Store and Microsoft Store distributions of Fallout 3). LOOT will now check each localisation's folder in the order of Windows' preferred user interface languages, so it should now pick the same localisation as the store's launcher.
- Updated the Danish translation.
- Updated libloot to v0.18.2.

12.10 0.18.5 - 2022-10-02

12.10.1 Added

- Built-in support for the GOG distribution of Skyrim Special Edition.
- LOOT will now display a warning message reminding the user to launch Morrowind with MWSE if a Morrowind install has more than 254 plugins active and MWSE is installed.

12.10.2 Fixed

- If Oblivion's `Oblivion.ini` could not be found or read, or if it did not contain the `bUseMyGamesDirectory` setting, the game's install path would be used as the parent directory for `plugins.txt`. LOOT now correctly defaults to using the game's local app data directory, and only uses the install path if `bUseMyGamesDirectory=0` is found. Via libloot.

12.10.3 Changed

- Improved the formatting of plugin metadata when it is serialised as YAML. Via libloot.
- Updated the Bulgarian translation.
- Updated the German translation.
- Updated the Ukrainian translation.
- Updated libloot to 0.18.1.
- Updated Qt to 6.4.0.

12.11 0.18.4 - 2022-08-28

12.11.1 Added

- Mnemonics (Alt keyboard shortcuts) have been added for LOOT's menus and sidebar headings.
- The groups editor's window position is now saved.
- The groups editor now has a button to auto-arrange the layout of groups.
- The groups editor now prompts when exiting without saving and changes have been made.

- Debug logging now replaces the user's home directory (i.e. the value of `%USERPROFILE%`) with the literal string `%USERPROFILE%` to help avoid the user accidentally revealing their name when sharing their debug log.
- The Sort Plugins, Update Masterlist, Apply Sorted Load Order and Discard Sorted Load Order toolbar actions have been added to the Game menu so that they can be selected using keyboard navigation.

12.11.2 Fixed

- Groups with only out-edges are now saved when exiting the groups editor.
- The height of sidebar rows now scales with text line height so that text is not cut off when using Windows text scaling greater than 100%.
- LOOT's installer no longer double-encodes the settings file when it sets LOOT's language, so non-ASCII text like language names is no longer mangled.
- LOOT's uninstaller now correctly removes a variety of files and directories that it previously missed.
- The plugin menu is no longer incorrectly disabled when filtering visible plugins.
- Refreshing LOOT's content no longer enables the plugin menu with no plugin selected.
- The general information card could be sized incorrectly when switching between games.
- Plugin card heights could be calculated incorrectly when changing the width of the cards list.
- LOOT no longer logs an unnecessary error when downloading a masterlist for the first time.
- LOOT no longer logs an unnecessary error when setting group positions in the groups editor for the first time.

12.11.3 Changed

- Disabling the warnings and errors filter now restores its component filters' previous states instead of disabling all of them.
- The text for sources displayed on plugin cards can now wrap around to new lines.
- Keyboard navigation of the user interface has been improved:
  - Navigating between elements using the Tab key now does so in a more intuitive order in the filters sidebar, groups editor, game settings panel, new game dialog and settings dialog.
  - The table views in the plugins sidebar panel and plugin metadata editor and the game registry keys text box no longer prevent the Tab key from being used to move from them to the next UI element.
  - The message content editor dialog no longer closes if the Tab key is pressed while it is open.
  - The step size for the minimum header version game setting input has been changed from 1 to 0.01.
- The group nodes (circles) in the groups editor now have a little padding to make selecting them easier.
- Theme changes are now applied when saving and exiting the settings dialog, instead of when LOOT starts.
- Updated the Bulgarian translation.
- Updated the Finnish translation.
- Updated the French translation.
- Updated the German translation.
- Updated the Italian translation.
- Updated the Ukrainian translation.

- Updated zlib to 1.2.12.
- Updated minizip-ng to 3.0.6.
- Updated spdlog to 1.10.0.
- Updated Qt to 6.2.4.
- Replaced cpptoml with toml++.

12.12 0.18.3 - 2022-05-21

12.12.1 Added

- A "Show only warnings and errors" filter has been added that combines the Bash Tags, sources, notes and messageless plugins filters.
- A "Show only empty plugins" filter hides any plugins that are not empty.
- The Groups Editor window can now be maximised and minimised using the new buttons in the window frame.
- Group positions in the Groups Editor will now be remembered, unless a group with no saved position is encountered when opening the Groups Editor.

12.12.2 Fixed

- When checking if old (pre-0.18.0) game masterlist settings could be migrated, LOOT checked the wrong settings fields, so would never display a warning if automatic migration couldn't be done.
- LOOT detects and logs when it's run from Mod Organizer, but its detection did not work for newer versions of Mod Organizer.
- LOOT would forget about any groups that were not connected to any other groups when exiting the Groups Editor.
- The progress bar in the progress dialog now uses the full width of the dialog as intended.
- When opening the plugin metadata editor for a plugin assigned to a group that does not exist, LOOT would set the Group dropdown to the first listed group. It now adds the missing group to the list (with a note that the group does not exist) and selects that group.

12.12.3 Changed

- If sorting makes no changes a notification dialog is now displayed by default. The new dialog can be suppressed using a new setting in LOOT's settings dialog.
- Groups graph layout has been improved: it now runs left to right to make use of the available space in most screens, group names will no longer overlap, and the layout algorithm now produces better results for non-trivial graphs.
- Groups in the Groups Editor graph now have a little padding so that their names do not run right to the edge of the graph's area.
- When a new group is added in the Groups Editor, it is now added in the centre of the visible area, and offset downwards if there is already something at that location.
- The game install path and local AppData path settings now have folder pickers that can be used to simplify setting values for those settings.

- When metadata is copied to the clipboard, the BBCode tags are now separated from the metadata YAML by line breaks.
- Updated the Bulgarian translation.
- Updated the Finnish translation.
- Updated the French translation.
- Updated the German translation.
- Updated the Japanese translation.
- Updated the Russian translation.
- Updated the Ukrainian translation.

12.13 0.18.2 - 2022-03-23

12.13.1 Added

- LOOT now logs whether it's 32-bit or 64-bit and the operating system and CPU architecture it's running on, to aid debugging.

12.13.2 Fixed

- When built using Qt 5, LOOT requires the MSVC 2010 redistributable to be installed, which was unknown. The requirement is now documented and the installer will now download and install the redistributable if it cannot find it already installed.
- The installer did not include two OpenSSL DLLs when packaging a LOOT build based on Qt 5. This meant that masterlist update would fail when using LOOT's default sources, or any other HTTPS URL sources.

  The two DLLs that were missing have different filenames depending on the build type. For 32-bit builds, they are `libcrypto-1_1.dll` and `libssl-1_1.dll`. For 64-bit builds, they are `libcrypto-1_1-x64.dll` and `libssl-1_1-x64.dll`.
- Entering text into the text input in the groups editor will make the "Add a new group" button the default, so that pressing the Enter key will add the named group instead of exiting the editor.

12.13.3 Changed

- LOOT now detects installed themes once on startup instead of each time the settings dialog is opened, reducing the delay before the dialog is displayed.
- When migrating LOOT game folders, LOOT now migrates a `SkyrimSE` folder (only used by LOOT v0.10.0) when loading that game, to match migration of other game folders. Previously that folder would be migrated when loading LOOT's settings, and only when loading settings saved by LOOT v0.10.0.
- LOOT now writes its log with debug verbosity before LOOT's settings are loaded, to prevent any low-severity messages written during that time always being lost.
- Updated the French translation.
- Updated the German translation.

12.13.4 Removed

- The `D3Dcompiler_47.dll`, `libEGL.dll`, `libGLESv2.dll` and `opengl32sw.dll` DLLs are no longer included in LOOT packages as they appear to be unused and removing them reduces package and install sizes by at least 30%.

12.14 0.18.1 - 2022-03-15

12.14.1 Added

- The "Search Cards" button has been reintroduced to the toolbar.
- The Plugin menu now has a "Copy Plugin Name" action.
- A "Clear" button is now displayed in the content filter and search inputs to help quickly empty them.
- A new "Is instance of base game" game setting to help distinguish between instances of the base game types and total conversions that build off of those base game types.

12.14.2 Fixed

- An empty regular expression search pattern no longer matches all plugin cards.
- The Group tab in the plugin metadata editor now correctly displays a "Has User Metadata" icon when a user has overridden the plugin's group.
- The plugin content filters were not applied correctly.
- Enderal Special Edition is no longer detected as installed if Skyrim Special Edition is installed through the Microsoft Store.
- The search dialog now navigates to the matching card and disables its navigation buttons when there is only one search result.

12.14.3 Changed

- The content filter is now applied on text entry (i.e. as you type) instead of waiting for the Enter key to be pressed or another user interface element to be selected.
- Settings are now saved when the "Save" button is used to exit the Settings dialog instead of only on quitting LOOT, to guard against a crash after exiting the dialog causing changes to be lost.
- The Settings dialog's "General" panel now includes text that explains that the Language and Theme settings only take effect after restarting LOOT. Previously this information was conveyed in tooltips.
- Opening the metadata editor for a plugin now scrolls to that plugin in the sidebar and card lists.
- The "Master File" icon is now called the "Master Plugin" icon for consistency with the other plugin type icons, and the "Master File" game setting now has the label "Main Master Plugin" for clarity.
- The main window's content area now has some padding to avoid some visual confusion.
- A minor performance improvement to all operations involving the sidebar and plugin card lists.
- LOOT now supports migrating from old default prelude and masterlist sources in readiness for any potential future changes to the default source locations.
- Updated the Bulgarian translation.

- Updated the German translation.
- Updated the Italian translation.
- Updated the Ukrainian translation.

12.14.4 Removed

- The `fontFamily` field in LOOT's languages settings, as it's no longer used as of LOOT v0.18.0.

12.15 0.18.0 - 2022-03-07

12.15.1 Added

- Support for games installed through the Microsoft Store or Xbox apps. Older versions of the apps install games with very restricted permissions that are difficult to change, and which cause problems when modding. Newer versions install games with much less restricted permissions, but there are still some issues that are not present in versions of the games installed from other sources like Steam or GOG. See *Microsoft Store Compatibility* for more information.
- The `--game-path` CLI parameter can be used in conjunction with `--game` to replace the identified game's install path in LOOT's settings.
- LOOT will now display a warning message in a plugin's card if it makes any Bash Tag suggestions that would be overridden by the content of an installed BashTags file for that plugin.
- Location metadata is now displayed at the bottom of plugin cards.
- It's now possible to search cards using regular expressions by ticking the "Use regular expression" checkbox in the search dialog.
- It's now possible to filter plugin content using a regular expression by ticking the "Use regular expression" checkbox below the content filter input in the sidebar.
- A "Hide Sources" filter has been added to control the display of location metadata. It is enabled by default.
- A "Hide Creation Club plugins" filter has been added to hide any installed Creation Club plugins' cards for games that support the Creation Club. It is disabled by default.
- The sidebar plugins list now includes a column that contains the plugin's position in the load order.
- The File menu has a new "Backup LOOT Data" action that creates a timestamped zip file in `%LOCALAPPDATA%\LOOT\backups\` that contains the contents of `%LOCALAPPDATA%\LOOT`, excluding the `backups` directory, any `.git` directories and the `LOOTDebugLog.txt` file.
- LOOT will now automatically backup its existing data when a new version of LOOT is run for the first time.
- The Game menu has a new "Fix Ambiguous Load Order" action. It starts off disabled, but LOOT will enable it and display a warning dialog if it detects an ambiguous load order (e.g. when you've just installed a new plugin and not yet given it an explicit load order position). The menu action saves the load order that is seen by LOOT so that there's no room for ambiguity.
- The Help menu has a new "Join Discord Server" action that opens the LOOT Discord server's invitation link in your default web browser.
- It's now possible to configure a game's minimum header version using the new "Minimum Header Version" field for games in the settings dialog.

- It's now possible to view and edit multilingual message content in the plugin metadata editor. The editor tables display the text selected for the current language, and double-clicking on a table cell holding message content will open a dialog with an editable table containing the multilingual content.
- A "Detail" column has been added to the plugin metadata editor's Requirements, Incompatibilities and Dirty Plugin Info tabs to represent the metadata's detail field.

12.15.2 Fixed

- LOOT would sometimes display a blank white window when run.
- LOOT's uninstaller did not remove the LOOT game folders for Skyrim Special Edition, Skyrim VR, Fallout 4 VR, Nehrim, Enderal or Enderal Special Edition when asked to remove user data.
- When sorting failed LOOT would display an error message giving a path to a file that may be read-only, but the file path was always wrong for Morrowind and was also wrong if using a non-default local AppData path for the current game.
- Two versions that only differ by the presence and absence of pre-release identifiers were not correctly compared according to Semantic Versioning, which states that 1.0.0-alpha is less than 1.0.0. Via libloot.

12.15.3 Changed

- Official LOOT releases now require the MSVC 2019 redistributable, which LOOT's installer will automatically download and install if necessary. In additon, a 64-bit build is available that requires a 64-bit version of Windows 10 (1809) or later, and this build is recommended for everyone with a PC that meets that requirement.
- The user interface has been completely replaced by a new implementation using Qt. The new user interface is more efficient, responsive and maintainable, and has a substantially different look and feel. In additon, it introduces the following changes to LOOT's functionality:
  - The toolbar overflow menu items have been moved into File, Game and Help menus in the new menu bar.
  - Plugin cards no longer have menus: instead there's a Plugin menu in the menu bar that contains the same actions, which operate on the plugin that's currently selected in the sidebar.
  - Notifications are now displayed in the status bar rather than in a pop-up toast widget.
  - It's no longer possible to select card text to copy it to the clipboard, so instead there's a "Copy Card Content" action in the Plugin menu.
  - Clicking on a plugin in the sidebar selects it, and double-clicking scrolls to its card, instead of single-clicking scrolling to its card and double-clicking opening it in the metadata editor.
  - The game selection dropdown now only lists games that LOOT detects are installed, instead of displaying all configured games and disabling those that aren't detected.
  - Markdown text is now interpreted as CommonMark instead of GitHub Flavored Markdown.
  - Themes have been reimplemented, see the *Themes* section for more information about the new theme file formats.
- Updating the masterlist prelude and masterlists no longer uses Git. This massively speeds up fetching the prelude or masterlist for the first time.
  - Each pair of repository URL and branch settings has been replaced by a source setting that accepts a local path or HTTP(S) URL of a metadata file.

    LOOT will migrate existing repository URL and branch settings for any repository on GitHub. It will also migrate local repository paths so long as the path is to a Git repository with the relevant metadata file in

the repository working copy's root directory. LOOT will display a warning if it cannot migrate existing settings.

  - The revision ID displayed by LOOT is now the Git blob hash of the file instead of the Git commit hash that the file is from. When calculating the hash, LOOT first replaces all CRLF line endings with LF, which may cause it to produce different blob hash values from Git when using an unofficial masterlist.
  - The date displayed by LOOT is now the date on which the masterlist was last updated, not the date of the Git commit that it was updated to.
- The First Time Tips dialog is now displayed before loading the game it's running for, and no longer runs if auto-sort is enabled.
- The "Open Debug Log Location" menu action has been renamed to "Open LOOT Data Folder".
- The "Local Data Path" game setting has been renamed to "Local AppData Path".
- Bash Tag suggestions are now hidden by default.
- The Active Plugins count in the General Information card has been split into Active Regular Plugins and Active Light Plugins for games that support light plugins, as they have separate limits.
- Content is now copied as Markdown that is equivalent to what is displayed, instead of as raw JSON data.
- Plugin metadata is now copied as YAML instead of JSON, using the same format as LOOT uses when saving user metadata.
- Bash Tags are now displayed below messages because they're generally of less interest to users, and they're grouped together to make it more obvious what they are.
- The Groups Editor now lays out groups vertically rather than horizontally.
- The Groups Editor no longer has a separate "drawing mode": instead, lines between groups can be drawn by double-clicking a node then dragging to another node, as in LOOT v0.16.1 and earlier.
- LOOT's game folders have been moved into `%LOCALAPPDATA%\LOOT\games` to differentiate them from the other files and folders in `%LOCALAPPDATA%\LOOT`. LOOT will migrate each existing game folder to the new location when it is run for that game.
- LOOT now supports v0.18 of its metadata syntax.
- Updated the Bulgarian translation.
- Updated the Czech translation.
- Updated the German translation.
- Updated the Italian translation.
- Updated the Spanish translation.
- Updated the Russian translation.
- Updated the Ukrainian translation.
- Updated Boost to v1.77.0.
- Updated libloot to v0.18.0.

12.15.4 Removed

- LOOT will no longer silently set an unchanged load order when sorting, which it previously did for Skyrim, Skyrim Special Edition, Skyrim VR, Fallout 4 and Fallout 4 VR.
- The "Jump To General Information" toolbar button.
- The Chromium Embedded Framework dependency.
- The nlohmann/json dependency.
- All JavaScript dependencies.

12.16 0.17.0 - 2021-12-19

12.16.1 Added

- Support for multiple registry keys per game.
- Support for registry keys in the 64-bit registry view.
- Steam and GOG registry keys for all supported games on each platform.
- Support for the masterlist prelude, a metadata file that is used to supply common metadata to all masterlists.
- The ability to filter plugins by their group.
- The `detail` message string is now appended when generating requirement and incompatibility messages.
- A Ukrainian translation by IllusiveMan196.

12.16.2 Fixed

- LOOT will only attempt to start for the preferred game if it is installed, and will otherwise fall back to the first listed installed game.
- Autocomplete error translations were unused.
- Some groups editor text was untranslatable.

12.16.3 Changed

- The groups editor now has a "drawing mode" toggle button. Edges can only be added in drawing mode, and nodes can only be moved around outside of drawing mode.
- The Skyrim VR and Fallout VR games now use new `skyrimvr` and `falloutvr` masterlist repositories. The new repositories are independent from the `skyrimse` and `fallout4` repositories that were previously used.
- LOOT's installer now downloads the latest MSVC 2015/2017/2019 redistributable if it is not already installed, or if it is older than 14.15.26706.
- Sorting now checks for cycles before adding overlap edges, so that any cycles are caught before the slowest steps in the sorting process. Via libloot.
- Masterlist update no longer supports rolling back through revisions until a revision that can be successfully loaded is found. Via libloot.
- Updated libloot to v0.17.1.

- Updated nlohmann/json to v0.17.0.
- Updated spdlog to v1.9.2.
- Updated JS package dependencies.
- Updated to Inno Setup v6.2.0.
- Updated the German translation.
- Updated the Italian translation.
- Updated the Korean translation.
- Updated the Bulgarian translation.
- Updated the Russian translation.
- Updated the Spanish translation.

12.17 0.16.1 - 2021-05-09

12.17.1 Added

- Support for Enderal: Forgotten Stories and Enderal: Forgotten Stories (Special Edition). LOOT's default configuration includes the necessary configuration for these games: if upgrading from an older version of LOOT, remove any existing `settings.toml` to have LOOT generate its default configuration.
- It is now possible to set the name of a game's folder within `%LOCALAPPDATA%` using the `local_folder` config property in LOOT's `settings.toml` file. It cannot be used at the same time as the `local_path` property.
- A Bulgarian translation by RacerBG.
- An Italian translation by Griam, nicola89b and albie.
- A Portuguese translation by ironmagician.

12.17.2 Fixed

- The "Hide inactive plugins" and "Hide messageless plugins" filters did not affect LOOT's search, which would count hidden plugins in its results and attempt to navigate between them.
- Invalid plugins were not hidden in some cases.
- Linux builds did not correctly handle case-insensitivity of plugin names during sorting on filesystems with case folding enabled. Via libloot.

12.17.3 Changed

- The settings dialog has been redesigned to better accommodate a longer list of supported games and give more space to their configuration inputs.
- If the selected game cannot be found, the error message displayed by LOOT now suggests running the game's launcher as this is a very common fix.
- If LOOT fails to read a game's settings from `settings.toml`, it will now log the error in its debug log.
- Themes are now sorted lexicographically in their selection dropdown in LOOT's settings.

- Most occurances of the terms "Light Master" or "Light Master File" have been replaced by "Light Plugin" to reflect that whether or not a plugin is light is independent of whether it is a master.
- The installer once again downloads the MSVC redistributable if it is not already installed, as it did before LOOT v0.16.0.
- Updated the Brazilian Portuguese translation.
- Updated the Chinese translation.
- Updated the German translation.
- Updated Boost to 1.72.0.
- Updated CEF to v90.6.5+g7a604aa+chromium-90.0.4430.93.
- Updated libloot to 0.16.3.
- Updated spdlog to 1.8.5.
- Updated JS package dependencies.

12.17.4 Removed

- The "do not clean" filter, as messages using that filter no longer exist in recent versions of any of LOOT's masterlists.

12.18 0.16.0 - 2020-08-22

12.18.1 Fixed

- LOOT did not display generated messages (such as errors about missing masters) for plugins that had no metadata after evaluating conditions.
- Existing messages were not displayed in the plugin metadata editor.
- Game data was loaded twice on startup.
- Changing LOOT's theme now stores `theme.css` in `%LOCALAPPDATA%\LOOT` to avoid permissions issues due to User Account Control (UAC).
- When getting metadata for a plugin, LOOT would prefer masterlist metadata over userlist metadata if they conflicted, which was the opposite of the intended behaviour.
- Clearing user groups metadata using the "Clear All User Metadata" menu option did not remove them from the UI.
- LOOT now correctly identifies the BSAs that a Skyrim SE or Skyrim VR loads. This assumes that Skyrim VR plugins load BSAs in the same way as Skyrim SE. Previously LOOT would use the same rules as the Fallout games for Skyrim SE or VR, which was incorrect. Via libloot.

12.18.2 Changed

- Missing groups are now added as userlist groups when the groups editor is opened, to make it easier to recover from sorting errors due to missing groups.
- The "has user metadata" icon is now displayed on each tab of the metadata editor that contains user metadata, apart from the "Main" tab.
- When getting metadata for a plugin, metadata from a plugin's specific metadata object is preferred over metadata from any matching regex entries, and earlier regex entries now take precedence over later regex entries (as listed in the masterlist or userlist). Via libloot.
- CRC calculations in metadata conditions are now much faster for larger files. Via libloot.
- Directory paths are now handled more gracefully when encountered by `checksum()`, `version()` and `product_version()` conditions. Via libloot.
- When comparing metadata objects, all their fields are now compared. This means that objects that were previously treated as equal but had unequal fields that were not taken into account are now treated as unequal. For example, two requirements with the same filename but different conditions will now both appear in the metadata editor. Via libloot.
- When loading plugins, LOOT identifies their corresponding archive files (`*.bsa` or `*.ba2`, depending on the game) more quickly. Via libloot.
- The order of collection elements in plugin metadata objects is now preserved. Via libloot.
- The installer now bundles the MSVC redistributable instead of downloading it if required, as the plugin providing the download functionality is no longer available.
- Updated CEF to v84.4.1+gfdc7504+chromium-84.0.4147.105.
- Updated spdlog to v1.7.0.
- Updated libloot to v0.16.1.
- Updated nlohmann/json to v3.9.1.
- Updated JS package dependencies.

12.18.3 Removed

- It's no longer possible to disable plugin metadata, though doing so has never had any effect.

12.19 0.15.1 - 2019-12-10

12.19.1 Fixed

- The "Open Groups Editor" menu item could not be translated (this wasn't properly fixed in v0.15.0).
- The changelog for the 0.15.0 release was missing.

12.20 0.15.0 - 2019-12-10

12.20.1 Fixed

- The "Open Groups Editor" menu item could not be translated.
- The "Open Groups Editor" menu item was not disabled if game loading failed.
- LOOT would fail to select a game if the preferred game was not installed but another game was.
- LOOT was unable to extract versions from plugin descriptions containing `version:` followed by whitespace and one or more digits. Via libloot.
- LOOT did not error if masterlist metadata defined a group that loaded after another group that was not defined in the masterlist, but which was defined in user metadata. This was unintentional, and now all groups mentioned in masterlist metadata must now be defined in the masterlist. Via libloot.

12.20.2 Changed

- The GUI is now better at handling initialisation failures.
- The "Add New Row" icon button in editable tables has been replaced by text-only button, and its implementation tweaked to reduce the chance of breakage.
- The range of FormIDs that are recognised as valid in light masters has been extended for Fallout 4 plugins, from between `0x800` and `0xFFF` inclusive to between `0x001` and `0xFFF` inclusive, to reflect the extended range supported by Fallout 4 v1.10.162.0.0. The valid range for Skyrim Special Edition plugins is unchanged. Via libloot.
- LOOT now supports v0.15 of the metadata syntax. Via libloot.
- Updated the German translation.
- Updated libloot to v0.15.1.
- Updated nlohmann/json to v3.7.3.
- Updated spdlog to v1.4.2.

12.20.3 Removed

- The ability to specify the HTML file URL to load as a CLI parameter, as it could cause users to see a white screen on launch if they ran LOOT with an unrecognised CLI parameter.

12.21 0.14.6 - 2019-09-28

12.21.1 Added

- Support for TES III: Morrowind.
- Support for selecting a theme in LOOT's settings dialog, making it easier to use the dark theme that LOOT has bundled since v0.9.2.

- Support for specifying a font family to use per language, so that different languages can use different fonts. The default font families are `Roboto, Noto, sans-serif`. Korean prefixes this with Malgun Gothic, Chinese with Microsoft Yahei, and Japanese with Meiryo. Font families are specified in the new `languages` table in LOOT's `settings.toml`.

12.21.2 Fixed

- Regular expressions in condition strings are now prefixed with `^` and suffixed with `$` before evaluation to ensure that only exact matches to the given expression are found. Via libloot.
- LOOT's taskbar icon would sometimes be displayed with a black bar down its left side.

12.21.3 Changed

- The languages that LOOT supports are no longer hardcoded: the list is now read from the new `languages` table in LOOT's `settings.toml`. A supported language is expected to have a Gettext MO file at `resources/l10n/<ISO code>/LC_MESSAGES/loot.mo`, relative to `LOOT.exe`.
- Updated libloot to v0.14.10.
- Updated nlohmann/json to v3.7.0.
- Updated JS package dependencies.

12.22 0.14.5 - 2019-07-04

12.22.1 Fixed

- Filename comparisons implemented case-insensitivity incorrectly, which caused LOOT to not properly recognise some files, depending on the characters in their filename and the current locale. On Windows, LOOT now implements case-insensitivity using the same case folding rules as Windows itself. On Linux, LOOT uses the locale-independent case folding rules provided by the ICU library, which are very similar but not identical to the rules used by Windows.
- Evaluating *version()* and *product_version()* conditions will no longer error if the given executable has no version fields. Instead, it will be evaluated as having no version. Via libloot.
- Sorting would not preserve the existing relative positions of plugins that had no relative positioning enforced by plugin data or metadata, if one or both of their filenames were not case-sensitively equal to their entries in plugins.txt / loadorder.txt. Load order position comparison is now correctly case-insensitive. Via libloot.

12.22.2 Changed

- Improved load order sorting performance.
- Game names and game folder names are now handled case-sensitively to avoid unnecessary and possibly incorrect case folding.
- Updated libloot to v0.14.8.
- Downgraded CEF to v3.3440.1806.g65046b7, as the hashes for v74.1.16+ge20b240+chromium-74.0.3729.131 kept changing unexpectedly, causing builds to fail.
- Updated the German translation.

- Updated the Japanese translation.
- Updated the Russian translation.

12.23 0.14.4 - 2019-05-11

12.23.1 Fixed

- Any instances of `\.` in messages would be incorrectly displayed as `..`
- LOOT would unnecessarily ignore intermediate plugins in a non-master to master cycle involving groups, leading to unexpected results when sorting plugins (via libloot).
- `HearthFires.esm` was not recognised as a hardcoded plugin on case-sensitive filesystems, causing a cyclic interaction error when sorting Skyrim or Skyrim SE (via libloot).

12.23.2 Changed

- Groups that contain installed plugins can no longer be deleted in the groups editor.
- Clicking on a group in the groups editor will now display a list of the installed plugins in that group in the editor's sidebar.
- An error message is now displayed for each plugin that belongs to a nonexistent group.
- Game configuration can now include the root Registry key when specifying a registry key. If no root key is specified, `HKEY_LOCAL_MACHINE` is used. The recognised root keys are:
  - `HKEY_CLASSES_ROOT`
  - `HKEY_CURRENT_CONFIG`
  - `HKEY_CURRENT_USER`
  - `HKEY_LOCAL_MACHINE`
  - `HKEY_USERS`
- Updated the Russian translation.
- Updated libloot to v0.14.6.
- Updated CEF to v74.1.16+ge20b240+chromium-74.0.3729.131.
- Updated nlohmann/json to v3.6.1.
- Updated spdlog to v1.3.1.

12.24 0.14.3 - 2019-02-10

12.24.1 Fixed

- Plugin counters would be set to zero after cancelling a load order sort.
- The user interface would not display default values for some data if overriding values were removed (e.g. removing a plugin's user metadata would not set its group back to the default if no group was set in the masterlist).

- Saving user metadata with the default group would store that group membership in user metadata even if the plugin was already in the default group.
- Condition parsing now errors if it does not consume the whole condition string, so invalid syntax is not silently ignored (via libloot).
- Conditions were not parsed past the first instance of `file(<regex>)`, `active(<regex>)`, `many(<regex>)` or `many_active(<regex>)` (via libloot).
- LOOT could crash on startup or changing game when trying to check if the game or data paths are symlinks. If a check fails, LOOT will now assume the path is not a symlink. Via libloot.

12.24.2 Changed

- Updated libloot to v0.14.4.

12.25 0.14.2 - 2019-01-20

12.25.1 Fixed

- An error when loading plugins with a file present in the plugins directory that has a filename containing characters that cannot be represented in the system code page. Via libloot.
- An error when trying to read the version of an executable that does not have a US English version information resource. Executable versions are now read from the file's first version information resource, whatever its language. Via libloot.

12.25.2 Changed

- Updated libloot to 0.14.2.

12.26 0.14.1 - 2019-01-19

12.26.1 Fixed

- The LOOT update checker would fail when LOOT's version number was equal to the version number of the latest release.

12.27 0.14.0 - 2019-01-19

12.27.1 Added

- An error message will now be displayed for any light plugin that contains new records with FormIDs outside the valid range for light plugins.
- A warning message will now be displayed for any plugin that has a header version that is older than is used by the game, to help draw attention to plugins that have been incorrectly ported from older games. The header version checked is the value of the version field in the `HEDR` subrecord of the plugin's `TES4` record.

- A section to the documentation that explains LOOT's sorting algorithm.

12.27.2 Fixed

- Creating a new group by pressing the Enter key after typing a name in the Groups Editor input field no longer leaves the group creation button enabled.
- Incorrect handling of non-ASCII characters in plugin filenames when getting their active load order indices, which could lead to incorrect indices being displayed in the sidebar.
- Incorrect handling of non-ASCII characters in games' LOOT folder names. By default all folder names only contained ASCII characters, so this would only affect customised folder names.
- BSAs/BA2s loaded by non-ASCII plugins for Oblivion, Fallout 3, Fallout: New Vegas and Fallout 4 may not have been detected due to incorrect case-insensitivity handling (via LOOT API).
- Fixed incorrect case-insensitivity handling for non-ASCII plugin filenames and File metadata names (via LOOT API).
- Path equivalence checks could be inaccurate as they were using case-insensitive string comparisons, which may not match filesystem behaviour. Filesystem equivalence checks are now used to improve correctness. (Via LOOT API).
- Errors due to filesystem permissions when cloning a new masterlist repository into an existing game directory. Deleting the temporary directory is now deferred until after its contents have been copied into the game directory, and if an error is encountered when deleting the temporary directory, it is logged but does not cause the masterlist update to fail. (Via LOOT API).
- The Czech translation mangled placeholders in message strings, causing errors when it was used.

12.27.3 Changed

- LOOT now requires a C++17-compatible compiler, so Windows builds now require the MSVC 2017 x86 redistributable instead of the MSVC 2015 x86 redistributable.
- The masterlist or default group for a plugin in the plugin editor's group dropdown is now styled with bold dark blue text to make it easier to undo user customisation of a plugin's group.
- Cyclic interaction errors will now detail the data source of each interaction in the cyclic path, to make it easier to identify the problematic metadata and so fix it.
- Updated the Japanese translation.
- Updated the German translation.
- LOOT now supports v0.14 of the metadata syntax (via LOOT API).
- Updated LOOT API, which has been renamed to libloot, to 0.14.1.
- Updated cpptoml to v0.1.1.
- Updated spdlog to v1.3.0.
- Updated nlohmann/json to v3.5.0.
- Updated JavaScript GUI dependencies.

12.28 0.13.6 - 2018-11-27

12.28.1 Fixed

- Load order indices in the sidebar were formatted incorrectly for light plugins.

12.29 0.13.5 - 2018-11-26

12.29.1 Fixed

- Out-of-bounds memory read that caused corruption in LOOT's `settings.toml` when LOOT is closed after having been unable to find any installed games.

12.29.2 Added

- An `--auto-sort` parameter that can be passed to `LOOT.exe` with `--game`, and which will cause LOOT to automatically sort the game's load order and apply the sorted load order, then quit. If an error is encountered at any point, auto-sort is cancelled.
- A Czech translation by ThePotatoChronicler.
- A documentation section that describes the sorting algorithm.

12.29.3 Changed

- Passing an invalid `--game` value as a parameter to `LOOT.exe` now causes an error to be displayed.
- The Groups Editor now uses a left-to-right layout when displaying the groups graph, which is clearer and more consistent than the previous layout.
- Updated GUI dependencies.
- Updated Japanese translation.

12.30 0.13.4 - 2018-09-25

12.30.1 Fixed

- Warnings were displayed for ghosted plugins saying they were invalid and would be ignored when they were not.
- Filesystem errors when trying to set permissions during a masterlist update that clones a new repository (via LOOT API).

12.30.2 Changed

- The Group dropdown menu in the metadata editor now "drops up" to reduce the amount of scrolling necesary by default to see the full list.
- The GUI is now based on a mix of Polymer 3 and React elements.
- Updated GUI dependencies.
- Updated LOOT API to v0.13.8.

12.31 0.13.3 - 2018-09-11

12.31.1 Fixed

- LOOT's "check for updates" functionality was failing due to the latest release unexpectedly not appearing on the first page of results when fetching repository tag data.

12.32 0.13.2 - 2018-09-10

12.32.1 Fixed

- Plugins with a *.esp* file extension and the light master flag set no longer appear as masters.
- Running LOOT outside of its executable's directory no longer results in a blank window.
- Cursor displaying as text selector in dropdown lists.
- Incompatibility messages not being displayed for non-plugin files.
- Fallout 4's *DLCUltraHighResolution.esm* is now handled as a hardcoded plugin (via libloadorder via the LOOT API).
- Plugins that are corrupt past their TES4 header are now handled gracefully when sorting and removed from the UI, with a warning message displayed for each removed plugin.
- Metadata editor text fields now trim whitespace to avoid unexpected metadata mismatches.

12.32.2 Changed

- Updated Boost to v1.67.0.
- Updated spdlog to v1.1.0.
- Updated Google Test to v1.8.1.
- Updated cpptoml v0.1.0.
- Updated CEF to v3.3440.1806.g65046b7.
- Updated nlohmann/json to v3.2.0.
- Updated LOOT API to v0.13.7 which should carry a number of performance improvements with it.
- Updated Danish translation.

12.33 0.13.1 - 2018-06-03

12.33.1 Changed

- Sorting now enforces hardcoded plugin positions without the need for LOOT metadata. This helps LOOT avoid producing invalid load orders, particularly those involving Creation Club plugins (via LOOT API).
- Updated LOOT API to v0.13.5.
- Updated spdlog to v0.17.0.

12.34 0.13.0 - 2018-06-02

12.34.1 Added

- Support for Skyrim VR.
- Support for plugin groups. Each plugin belongs to a group, and groups can load after zero or more other groups, providing a concise way to load groups of plugins after other groups of plugins. The group a plugin belongs to can be set in the metadata editor, and groups can be edited in the new Groups Editor accessible through the main menu.
- LOOT's update checking on startup can now be toggled from the settings dialog.

12.34.2 Changed

- Bash Tag suggestions now display tags that are present in the plugin's description field in silver text.
- Sorting error messages now includes the full path to `plugins.txt` when suggesting it may be read-only.
- Updated the LOOT API to v0.13.4.
- Updated CEF to v3.3325.1758.g9aea513.
- Updated nlohmann/json to v3.1.2.

12.34.3 Removed

- Support for local and global priority metadata. Priorities have been superseded by groups, which provide similar functionality more accessibly.

12.34.4 Fixed

- `Cannot read property 'status' of undefined` errors could occur when LOOT attempted to check for updated and no Internet connection was available.
- An error that occurred when attempting to apply edits to clean or dirty plugin metadata.
- A potential error during sorting if the number of plugins installed changed since LOOT was started or its content was last refreshed.
- An error when applying a load order for Oblivion, Fallout 3 or Fallout: New Vegas involving a plugin with a timestamp earlier than 1970-01-01 00:00:00 UTC (via LOOT API).

- An error when loading the current load order for Skyrim with a `loadorder.txt` incorrectly encoded in Windows-1252 (via LOOT API).
- Various filesystem-related issues that could be encountered when updating masterlists, including failure due to file handles being left open while attempting to remove the files they referenced (via LOOT API).
- Incorrect load order positions were given for light-master-flagged `.esp` plugins when getting the load order (via LOOT API).
- Closing LOOT with the metadata editor open or unapplied sorting results displayed would not display a confirmation dialog.
- Editable table rows for non-user metadata were not being made read-only.
- User metadata was not used when checking the validity of a plugin's install environment (e.g. if any incompatible plugins are present).
- Bash Tag removal suggestions were treated as addition suggestions unless the tag name was prefixed by an additional `-`.
- File metadata's `display` field wasn't used in generated UI messages.
- The top divider in a scrollable dialog could be hidden when scrolling.

12.35 0.12.5 - 2018-03-19

12.35.1 Fixed

- LOOT now checks that its game subdirectories are actually directories, not just that they exist, erroring earlier and more helpfully when there is somehow a file with the same name in the LOOT data directory.
- Windows 7 users can now update their masterlists again without having to manually enable system-wide TLS 1.2 support. This was an issue after GitHub disabled support for older, insecure versions of TLS encryption because Microsoft didn't enable TLS 1.2 support in Windows 7 by default. Fixed via the LOOT API.

12.35.2 Changed

- Migrated all non-Polymer GUI dependencies from Bower to NPM.
- Refactored GUI JavaScript and custom elements into ES2015 modules.
- Introduced Webpack to bundle JavaScript and CSS for the GUI.
- Updated Polymer to v2.5.0.
- Updated the LOOT API to v0.12.5.

12.36 0.12.4 - 2018-02-22

12.36.1 Fixed

- Loading or saving a load order could be very slow because the plugins directory was scanned recursively, which is unnecessary. In the reported case, this fix caused saving a load order to go from 23 seconds to 43 milliseconds (via the LOOT API).
- Plugin parsing errors were being logged with trace severity, they are now logged as errors (via the LOOT API).
- Chromium console messages are now logged with severity levels that better match the severity with which they appear in the console (via the LOOT API).
- Saving a load order for Oblivion, Fallout 3 or Fallout: New Vegas now updates plugin access times to the current time for correctness (via the LOOT API).

12.36.2 Changed

- Added a specific message for sorting errors that mentions plugins.txt probably being read-only, as it's the most common cause of issues filed.
- Added missing mentions of Fallout 4 VR support.
- Performance improvement for load order operations (via the LOOT API).
- Updated the LOOT API to v0.12.4.
- Updated spdlog to v0.16.3.
- Updated nlohmann/json to v3.1.1.
- Updated CEF to v3.3282.1733.g9091548.

12.37 0.12.3 - 2018-02-10

12.37.1 Fixed

- LOOT wouldn't start when run by a user with a `%LOCALAPPDATA` path containing non-ASCII characters, which was a regression introduced in v0.12.0.
- The log buffer is flushed after every statement, fixing the regression introduced in v0.12.2.
- The uninstaller didn't remove `settings.toml`.

12.37.2 Changed

- Disabled CEF debug logging, as the `CEFDebugLog.txt` has generally been more misleading than helpful.

12.38 0.12.2 - 2018-02-05

12.38.1 Added

- Support for Fallout 4 VR.
- Support for configuring games' local paths, i.e. the directory in which their `plugins.txt` is stored. Each game entry in LOOT's `settings.toml` now has a `local_path` variable that is blank by default, which leaves it up to libloadorder (via the LOOT API) to determine the path. There is no GUI option to configure the value.
- Chromium console messages are now logged to `LOOTDebugLog.txt` to help when debugging.

12.38.2 Changed

- Updated LOOT API to v0.12.3.
- Replaced Protocol Buffers serialisation dependency with nlohmann/json v2.1.1.
- Replaced Boost.Log with spdlog v0.14.0.
- Downgraded Boost to 1.63.0 to take advantage of pre-built binaries on AppVeyor.
- Updated Japanese translation.

12.38.3 Removed

- The `--game-appdata-path` CLI parameter, which set the local path to use for all games, and which has been superceded by game-specific `local_path` configuration variables.

12.38.4 Fixed

- Plugins with a `.esp` file extension and the light master flag set are no longer treated as masters when sorting, so they can have other `.esp` files as masters without causing cyclic interaction sorting errors (via LOOT API).
- Sorting didn't update sidebar indices.

12.39 0.12.1 - 2017-12-03

12.39.1 Fixed

- Settings would not save correctly with debug logging disabled.
- LOOT API logging was disabled on Linux.
- Typos in the v0.12.0 changelog.

12.40 0.12.0 - 2017-12-02

12.40.1 Added

- Support for light master (`.esl`) plugins.
  - Light masters are indicated by a new icon on their plugin cards, and the "Master File" icon is suppressed for light masters.
  - In the sidebar, light masters all have the in-game load order index `FE`, followed by the hexadecimal index of the light master relative to only other light masters.
  - A new general warning message will be displayed when 255 normal plugins and at least one light master are active.
  - A new error message will be displayed for light masters that depend on a non-master plugin.
- Support for specifying the game local app data path using the `--game-appdata-path=<path>` command line parameter.
- Japanese translation by kuroko137.

12.40.2 Changed

- LOOT now stores its settings in a `settings.toml` file instead of a `settings.yaml` file. It cannot upgrade from the latter to the former itself, but a converter is available online.
- "Copy Load Order" now includes a third column for the index of light masters relative to other light masters.
- Updated the UI to use Polymer v2 and updated LOOT's custom elements to use the Custom Elements v1 syntax.
- LOOT API log messages are now included in the `LOOTDebugLog.txt` file, and are no longer written to `LOOTAPIDebugLog.txt`.
- Updated the Chinese translation.
- Updated the Danish translation.
- Updated the Russian translation.
- Updated the LOOT API to v0.12.1.
- Updated Lodash to b4.17.4.
- Updated Octokat to v0.8.0.
- Updated CEF to v3.3163.1671.g700dc25.

12.40.3 Fixed

- Error when adding a Bash Tag with no condition using the metadata editor.
- Detection of Skyrim and Skyrim SE when LOOT is installed in the same directory as both.
- General messages disappearing when cancelling a sort.
- Blank messages' content in the metadata editor after updating the masterlist.
- LOOT window size/position not restoring maximised state correctly.
- "Cannot read property of 'text' of undefined" error messages when something went wrong.

- The "new version available" message is no longer displayed for snapshot builds built from code newer than the latest release.
- Significant fixes in the LOOT API:
  - A crash would occur when loading an plugin that had invalid data past its header. Such plugins are now just silently ignored.
  - LOOT would not resolve game or local data paths that are junction links correctly, which caused problems later when trying to perform actions such as loading plugins.
  - Performing a masterlist update on a branch where the remote and local histories had diverged would fail. The existing local branch is now discarded and the remote branch checked out anew, as intended.

12.41 0.11.0 - 2017-05-13

12.41.1 Changed

- The LOOT application now uses the LOOT API, rather than sharing internal code with it.
- LOOT now writes to an additional log file, `LOOTAPIDebugLog.txt`.
- If LOOT is closed while maximised, it will now start maximised.
- Log timestamps now have microsecond precision.
- Updated to CEF v3.2924.1561.g06fde99.
- The LOOT API has had its code split into its own repository. Its documentation, along with the metadata syntax documentation, is now hosted separately.

12.41.2 Fixed

- A few inaccurate logging statements.
- Menu text wrapping during opening animation.
- Inconsistent editor priority values handling, causing priority values user metadata to not trigger the "Has User Metadata" icon appearing in certain circumstances.
- The LOOT window's title is now set on Linux.
- The LOOT window's size and position is now saved and restored on Linux.
- Clipboard operations are now supported on Linux (requires `xclip` to be installed).

12.42 0.10.3 - 2017-01-08

12.42.1 Added

- LOOT now creates a backup of the existing load order when applying a sorted load order. The backup is stored in LOOT's folder for the current game, and up to the three most recent backups are retained.

12.42.2 Changed

- If no game is detected when LOOT is launched and a valid game path or Registry key pointing to a game path is added in the Settings dialog, LOOT will select that game and refresh its content when the new settings are applied.
- Most exception-derived errors now display a generic error message, as exception messages are no longer translatable. Only metadata syntax exceptions still have their message displayed in the UI.
- Improved robustness of error handling when calculating file CRCs.
- Improved consistency of error logging.
- Errors and warnings are now always logged, even when debug logging is disabled.
- The First Time Tips and About dialogs are now fully translatable, with the exception of the legal text in the About dialog.
- Updated Russian translation.

12.42.3 Fixed

- A crash on startup if none of the supported games were detected.
- A crash when applying settings when none of the supported games are detected.
- Buttons and menu items for performing game-specific operations are now disabled while none of the supported games are detected.
- Initialisation error messages were formatted incorrectly.
- An error message reading `Cannot read property 'textContent' of undefined` could be displayed on startup due to UI elements initialising later than expected.
- The texts of the first plugin card and sidebar item were not being translated.
- LOOT now logs being unable to find a game's registry entry as `[info]`, not `[error]`.
- If an error was encountered while loading a userlist, constructing the error message produced a `boost::too_many_args` error that obscured the original error.
- The installer now checks for v14.0.24215 of the MSVC Redistributable, it was previously checking for v14.0.24212, which some users found insufficient.

12.43 0.10.2 - 2016-12-03

12.43.1 Added

- Support for specifying the path to use for LOOT's local data storage, via the `--loot-data-path` parameter.

12.43.2 Changed

- The metadata editor now displays an error message when the user inputs invalid priority values, in addition to the input's existing red underline styling for invalid values, and instead of validating the values when trying to save the metadata.
- LOOT's icon now scales better for high-DPI displays.
- LOOT's UI is now built as many loose files instead of one large HTML file, to aid debugging and development.
- Updated Chinese translation.
- Updated Chromium Embedded Framework to 3.2840.1517.gd7afec5.
- Updated libgit2 to 0.24.3.
- Updated Polymer to 1.7.0, and also updated various Polymer elements.

12.43.3 Fixed

- A crash could occur if some plugins that are hardcoded to always load were missing. Fixed by updating to libloadorder v9.5.4.
- Plugin cleaning metadata with no `info` value generated a warning message with no text.
- The LOOT update checker will no longer display an empty error dialog if the update check is unable to connect to the GitHub API (eg. if offline).
- Redate Plugins was accidentally disabled for Skyrim SE in v0.10.1, and had no effect for Skyrim SE in v0.10.0.
- Having more than ~ 100 plugins installed could make the sidebar's plugin list appear on top of dialogs.
- More UI text has been made available for translation.
- Tweak some text formatting to include more context for translators.
- Dirty plugin warning messages now distinguish between singular and plural forms for their ITM, deleted reference and deleted navmesh counts, to allow the construction of more grammatically-correct messages in English and other languages.
- The UI text for the metadata editor was always displayed in English even when LOOT was set to use another language, despite translations being available.
- It was possible to open the metadata editor during sorting by double-clicking a plugin in the sidebar.
- Removed a duplicate section in the documentation for editing metadata.

12.44 0.10.1 - 2016-11-12

12.44.1 Changed

- When saving a load order for Fallout 4 or Skyrim SE, the official plugins (including DLC plugins) are no longer written to `plugins.txt` to match game behaviour and improve interoperability with other modding utilities.
- LOOT now uses `Skyrim Special Edition` as the folder name for storing its Skyrim SE data, to mirror the game's own folder naming and improve interoperability with other modding utilities, and automatically renames any `SkyrimSE` folder created by LOOT v0.10.0.
- Updated Russian translation.
- Updated Chinese translation.

12.44.2 Fixed

- When saving a load order for Fallout 4 or Skyrim SE, the positions of official plugins (including DLC plugins) in `plugins.txt` are now ignored if they are present and a hardcoded order used instead. Note that there is a bug in Skyrim SE v1.2.39 that causes the DLC plugins to be loaded in timestamp order: this behaviour is ignored.
- If the LOOT installer installed the MSVC redistributable, the latter would silently force a restart, leading to possible data loss.
- It was possible to open the metadata editor between sorting and applying/cancelling a sorted load order, which would then cause an error when trying to close the editor. The editor is now correctly disabled during the sort process.

12.45 0.10.0 - 2016-11-06

12.45.1 Added

- Support for TES V: Skyrim Special Edition.
- Swedish translation by Mikael Hiort af Ornäs (Lakrits).
- More robust update checker, so now LOOT will notify users of an update without needing a masterlist to be present or for it to be updated for the new release, and will also detect when the user is using a non-release build with the same version number.

12.45.2 Changed

- LOOT now supports v0.10 of the metadata syntax. This breaks compatibility with existing syntax, which may cause existing user metadata to fail to load. See the syntax version history for the details.
- The Global Priority toggle button in the metadata editor has been replaced with an input field to reflect the change in syntax for global priorities.
- Added a "Clean Plugin Info" tab to the metadata editor, for editing metadata that identifies a plugin as being clean.
- Added a "Verified clean" icon to plugin cards that is displayed for plugins that are identified as clean.
- All operations triggered from the UI are now processed asynchronously, which may have a minor positive effect on perceived performance.
- Error messages displayed in dialog boxes no longer include an error code.
- Rewrote the documentation, which is now hosted online at Read The Docs.
- Updated Simplified Chinese translation.
- Updated Russian translation.
- Updated German translation.
- Updated Danish translation.
- Updated CEF to 3.2840.1511.gb345083 and libgit2 to 0.24.2.

12.45.3 Fixed

- Cached plugin CRCs causing checksum conditions to always evaluate to false.
- Data being loaded twice when launching LOOT.
- Updating the masterlist when the user's `TEMP` and `TMP` environmental variables point to a different drive than the one LOOT is installed on.
- Incorrect error message display when there was an issue during initialisation.
- Sidebar plugin load order indices not updating when sorting changed plugin positions.
- The "Has User Metadata" icon not displaying when priority metadata was changed.

12.46 0.9.2 - 2016-08-03

12.46.1 Added

- Theming support and the dark theme have been reimplemented and reintroduced.
- Plugin filename and Bash Tag name fields will now autocomplete in the metadata editor.
- The in-game load order indices of active plugins are now displayed in the sidebar.

12.46.2 Changed

- Most URLs now use HTTPS.
- The Danish and French translations have been updated.
- The CEF (3.2743.1442.ge29124d), libespm (2.5.5), Polymer (1.6.0) and Pseudosem (1.1.0) dependencies have been updated to the versions given in brackets.

12.46.3 Fixed

- Error when applying filters on startup.
- Hidden plugin and message counters not updating correctly after sorting.
- An error occurring when the user's temporary files directory didn't exist and updating the masterlist tried to create a directory there.
- The installer failing if LOOT was previously installed on a drive that no longer exists. The installer now always gives the option to change the default install path it selects.
- Startup errors being reported incorrectly and causing additional errors that prevented the user from being informed of the original issue.
- The metadata editor's CRC input field being too short to fully display its validation error message.
- Errors when reading some Oblivion plugins during sorting, including the official DLC.
- Some cases where LOOT would fail to start.
- The conflict filter not including the Unofficial Skyrim Legendary Edition Patch's plugin (and any other plugin that overrides a very large number of records) in results.

- The "not sorted" message reappearing if the load order was sorted twice in one session and cancelled the second time.
- Version numbers where a digit was immediately followed by a letter not being detected.

12.47 0.9.1 - 2016-06-23

12.47.1 Added

- Support for Fallout 4's Contraptions Workshop DLC, and the upcoming Vault-Tec Workshop and Nuka-World DLC. Support for the latter two is based on their probable but unconfirmed plugin names, which may be subject to change.

12.47.2 Changed

- The content refresh menu item is now disabled during sorting.
- The conflicts filter toggle buttons have been removed from the plugin card menus, and the filter re-implemented as a dropdown menu of plugin names in the Filters sidebar tab.
- Enabling the conflicts filter now scrolls to the target plugin, which is no longer highlighted with a blue border.
- The layout of the Filters sidebar tab has been improved.
- The CEF (3.2704.1427.g95055fe), and libloadorder (9.4.0) dependencies have been updated to the versions given in brackets.
- Some code has been refactored to improve its quality.

12.47.3 Removed

- Support for Windows Vista.

12.47.4 Fixed

- User dirty metadata being read-only in the metadata editor.
- LOOT incorrectly reading a tag with no name from plugin descriptions containing `{{BASH:}}`.

12.48 0.9.0 - 2016-05-21

12.48.1 Added

- Support for Fallout 4.
- A warning message is displayed in the General Information card if the user has not sorted their load order in the current LOOT session.
- An error message is displayed in the General Information card when a cyclic interaction sorting error is encountered, and remains there until sorting is next attempted.

12.48.2 Changed

- Improve sorting performance by only reading the header when loading game's main master file.
- References to "BSAs" have been replaced with the more generic "Archives" as Fallout 4's BSA equivalents use a different file extension.
- The sorting process now recognises when the sorted load order is identical to the existing load order and informs the user, avoiding unnecessary filesystem interaction.
- The metadata editor has been reimplemented as a single resizeable panel displayed below the plugin card list instead of a separate editor for each plugin card.
- Editable table styling has been improved to more closely align to the Material Design guidelines.
- Minor UI changes have been made to scrollbar and focus outline styling to improve accessibility.
- UI interaction performance has been improved, especially when scrolling the plugin card list.
- The PayPal donation link now points to the PayPal.Me service, which has a more polished UX and lower fees.
- LOOT's settings file handling has been reimplemented, fixing crashes due to invalid settings values and allowing missing settings to use their default values.
- Plugin version string extraction has been reimplemented, improving its accuracy and maintainability.
- Plugin CRC, file and version condition evaluation has been optimised to use cached data where it exists, avoiding unnecessary filesystem interaction.
- The French and Danish translations have been updated.
- The installer now only creates one shortcut for LOOT in the Start menu, following Microsoft guidelines.
- A lot of code has been refactored and improved to increase its quality.
- The Boost (1.60), CEF (3.2623.1401.gb90a3be), libespm (2.5.2), libgit2 (0.24.1), libloadorder (9.3.0) and Polymer (1.4) dependencies have been updated to the versions given in brackets.

12.48.3 Removed

- The Flattr donation link.
- The experimental theming support, as its implementation was incompatible with Polymer 1.2's styling mechanisms.

12.48.4 Fixed

- Redate Plugins attempted to redate plugins that were missing, causing an error.
- LOOT would not launch when run by a user with a non-ASCII local application data path.
- Sorting processed priority value inheritance throughout the load order incorrectly, leading to some plugins being positioned incorrectly.
- The conflict filter displayed only the target plugin when enabled for the first time in a session.
- The behaviour of the search functionality was inconsistent.
- Duplicate messages could be displayed under certain circumstances.
- Opening the metadata editor for one plugin displayed the metadata for another plugin under certain circumstances.
- Changing the current game quickly could leave the UI unresponsive.

- Applying a filter then scrolling the plugin card list would display some cards with no content.
- Plugin cards would disappearing when jumping to a plugin card near the bottom of the load order using the sidebar.
- Clicking on a disabled element in a dropdown menu would cause the menu to close.
- The UI font size was too large, due to a misunderstanding of the Material Design guidelines.
- Attempting to build native Linux and 64-bit executables produced errors. Such builds are unsupported and no official builds are planned.

12.49 0.8.1 - 2015-09-27

12.49.1 Added

- Checks for safe file paths when parsing conditions.

12.49.2 Changed

- Updated Chinese translation.
- Updated Boost (1.59.0), libgit2 (0.23.2) and CEF (branch 2454) dependencies.

12.49.3 Fixed

- Crash when loading plugins due to lack of thread safety.
- The masterlist updater and validator not checking for valid condition and regex syntax.
- The masterlist updater not working correctly for Windows Vista users.

12.50 0.8.0 - 2015-07-22

12.50.1 Added

- Support for loading custom user interface themes, and added a dark theme.

12.50.2 Changed

- Improved detail of metadata syntax error messages.
- Improved plugin loading performance for computers with weaker multithreading capabilities (eg. non-hyperthreaded dual-core or single-core CPUs).
- LOOT no longer displays validity warnings for inactive plugins.
- LOOT now displays a more user-friendly error when a syntax error is encountered in an updated masterlist.
- Metadata syntax support changes, see the metadata syntax document for details.
- LOOT's installer now uses Inno Setup instead of NSIS.

- LOOT's installer now uninstalls previous versions of LOOT silently, preserving user data, instead of displaying the uninstaller UI.
- Updated German and Russian translations.
- Updated libgit2 to v0.23.0.

12.50.3 Fixed

- "Cannot read property 'push' of undefined" errors when sorting.
- Many miscellaneous bugs, including initialisation crashes and incorrect metadata input/output handling.
- Metadata editors not clearing unsaved edits when editing is cancelled.
- LOOT silently discarding some non-unique metadata: an error message will now be displayed when loading or attempting to apply such metadata.
- Userlist parsing errors being saved as general messages in the userlist.
- LOOT's version comparison behaviour for a wide variety of version string formats. This involved removing LOOT's usage of the Alphanum code library.

12.51 0.7.1 - 2015-06-22

12.51.1 Added

- Content search, accessible from an icon button in the header bar, and using the Ctrl-F keyboard shortcut.
- "Copy Load Order" feature to main menu.

12.51.2 Changed

- LOOT now uses versioned masterlists, so that new features can be used without breaking LOOT for users who haven't yet updated.
- Moved content filter into Filters sidebar tab. The Ctrl-F keyboard shortcut no longer focusses the content filter.
- Checkbox-toggled filters now have their last state restored on launch.
- Darkened background behind cards to increase contrast.
- Updated French translation.

12.51.3 Fixed

- LOOT UI opening in default browser on launch.
- "No existing load order position" errors when sorting.
- Message filters being ignored by plugin cards after navigating the list.
- Output of Bash Tag removal suggestions in userlists.
- Display of masterlist revisions where they were wrongly interpreted as numbers.

12.52 0.7.0 - 2015-05-20

12.52.1 Added

- Danish and Korean translations.
- If LOOT can't detect any installed games, it now launches to the settings dialog, where the game settings can be edited to allow a game to be detected.
- A "Copy Content" item in the main menu, to copy the plugin list and all information it contains to the clipboard as YAML-formatted text.
- A "Refresh Content" item in the main menu, which re-scans plugin headers and updates LOOT's content.
- LOOT is now built with High DPI display support.
- Masterlist updates can now be performed independently of sorting.
- A "First-Time Tips" dialog will be displayed on the first run of any particular version of LOOT.
- Attempting to close LOOT with an unapplied sorted load order or an open plugin editor will trigger a confirmation dialog.
- Support for GitHub Flavored Markdown in messages, minus features specific to the GitHub site, such as @mentions and emoji.
- Support for message content substitution metadata syntax in the masterlist.
- Display of LOOT's build revision has been added to the "About" dialog.
- Plugin location metadata can now be added through the user interface.
- A content filter, which hides plugins that don't have the filter text present in their filenames, versions, CRCs, Bash Tags or messages.

12.52.2 Changed

- New single-window HTML5-based interface and a new icon, based on Google's Material Design.
  - LOOT now parses the masterlist and plugin headers on startup, and the resulting content is displayed with the plugins in their current load order.
  - Each plugin now has its own editor, and multiple editors can be opened at once.
  - Drag 'n' drop of plugins from the sidebar into metadata editor tables no longer requires the conflicts filter to be enabled.
  - CRCs are calculated during conflict filtering or sorting, so are notdisplayed until either process has been performed.
  - The "View Debug Log" menu item has been replaced with a "Open Debug Log Location" menu item to make it easier to share the file itself.
  - Debug logging control has been simplified to enable/disable, replacing the "Debug Verbosity" setting with an "Enable Debug Logging" toggle.
  - Changes to game settings now take immediate effect.
  - Masterlist updating now exits earlier if the masterlist is already up-to-date.
  - Masterlist revisions are now displayed using the shortest unique substring that is at least 7 characters long.

  - Making edits to plugin metadata before applying a calculated load order no longer causes LOOT to recalculate the load order. Instead, the displayed load order is applied, and the metadata edits will be applied the next time sorting is performed.
  - All references to "UDRs" have been replaced by the more technically-correct "Deleted References" term.
  - The "Hide inactive plugin messages" filter has been replaced by a "Hide inactive plugins" filter.
  - Copied metadata is now wrapped in BBCode `[spoiler][code]...[/code][/spoiler]` tags for easier pasting into forum posts.
  - The Summary and General Messages cards have been combined into a General Information card.
- Sorting performance improvements.
- Updated Boost (1.58.0), libgit2 (0.22.2) and libloadorder dependencies.

12.52.3 Removed

- Messages with multiple language strings can no longer be created through the user interface. User-added multiple-language messages will be converted to single-language strings if their plugin's editor is opened then closed using the "OK" button.
- The "Copy Name" menu item has been removed, as plugin names can now be selected and copied using `Ctrl-C`.
- As LOOT no longer generates reports, it doesn't save them either.

12.52.4 Fixed

- The `settings.yaml` included with the installer was very old.
- Inactive incompatibilities were displayed as error messages. They are now displayed as warnings.
- Masterlist entries that matched the same plugin were not being merged. Now one exact match and any number of regex matches will be merged.
- Masterlist updating failed when a fast-forward merge was not possible (eg. when remote has been rebased, or a different repository is used). Such cases are now handled by deleting the local repository and re-cloning the remote.
- Masterlist updating failed when the path to LOOT's folder included a junction link.
- Masterlists would not 'update' to older revisions. This can be useful for testing, so now they can do so.
- Crashes when trying to read corrupt plugins and after masterlist update completion.
- LOOT would crash when trying to detect a game installed to a location in which the user does not have read permissions, now such games are treated as not being installed.
- Plugins with non-ASCII description text would cause `codecvt to wstring` errors.
- LOOT would accept any file with a `.esp` or `.esm` extension as a plugin. It now checks more thoroughly, by attempting to parse such files' headers.
- LOOT would only detect Skyrim plugins as loading BSAs. Plugins for the other games that also load BSAs are now correctly detected as such.
- Depending on the plugins involved, sorting could produce a different load order every time it was run. Sorting now produces unchanging load orders, using existing load order position where there is no reason to move a plugin.

12.53 0.6.1 - 2014-12-22

12.53.1 Added

- German translation.
- The Large Address Aware flag to the LOOT executable.

12.53.2 Changed

- Updated Boost (1.57.0), wxWidgets (3.0.2) and libloadorder (6.0.3) dependencies.
- The game menu is now updated when the settings window is exited with the "OK" button.
- Updated Russian translation.
- Updated Brazilian Portuguese translation.

12.53.3 Fixed

- Default Nehrim registry entry path.
- Messages in the wrong language being selected.
- LOOT windows opening off-screen if the screen area had been changed since last run.
- Read-only `.git` folders preventing repository deletion.
- Unnecessary plugins in cyclic dependency error messages.
- Bash Tag suggestions displaying incorrectly.
- The current game can no longer be deleted from the settings window.
- Plugin metadata being lost when the settings window was exited with the "OK" button, leading to possible condition evaluation issues.
- A blank report bug when running on systems which don't have Internet Explorer 11 installed.
- Reports appearing empty of all content when no global messages are to be displayed.

12.53.4 Security

- Updated libgit2 to 0.21.3, which includes a fix for a critical security vulnerability.

12.54 0.6.0 - 2014-07-05

12.54.1 Added

- Display of masterlist revision date in reports.
- Report filter for inactive plugin messages.
- The number of dirty plugins, active plugins and plugins in total to the report summary.
- A find dialog to the report viewer, initiated using the `Ctrl-F` keyboard shortcut.

- LOOT's windows now remember their last position and size.
- Command line parameter for selecting the game LOOT should run for.
- Finnish translation.

12.54.2 Changed

- Unified and improved the metadata editors launched during and outside of sorting.
  - The metadata editor now resizes more appropriately.
  - The mid-sorting instance hides the requirement, incompatibility, Bash Tags, dirty info and message lists.
  - Both instances now have a conflict filter, priority display in their plugin list and drag 'n' drop from the plugin list into whatever metadata lists are visible.
  - The mid-sorting instance also hides the load after entry edit button, and the button to add new entries (so drag 'n' drop is the only available method of adding entries).
  - The metadata editor now displays plugins with user edits using a tick beside their name, rather than bolding their name text.
  - Plugins that have been edited in the current instance have their list entry text bolded.
  - Checkboxes have been added to set whether or not a priority value is "global". The UI also now displays the priority value used in comparisons (ie. with the millions and higher digits omitted).
  - A right-click menu command for clearing all user-added metadata for all plugins has been added to the metadata editor.
- Missing master/requirement and incompatibility errors are downgraded to warnings if the plugin in question is inactive.
- Masterlist update errors have been made more user-friendly.
- If an error is encountered during masterlist update, LOOT will now silently delete the repository folder and attempt the update again. If it fails again, it will then report an error.
- Masterlist update now handles repository interaction a lot more like Git itself does, so should be less error-prone.
- Cyclic dependency error messages now detail the full cycle.
- LOOT's report now uses a static HTML file and generates a javascript file that is dynamically loaded to contain the report data. This removes the PugiXML build dependency.
- Debug log message priorities adjusted so that medium verbosity includes more useful data.
- Updated dependencies: libgit2 (v0.21.0), wxWidgets (v3.0.1), libloadorder (latest), libespm (latest).

12.54.3 Removed

- Support for Windows XP.
- Support for loading BOSS masterlists using the API. This was a leftover from when LOOT was BOSSv3 and backwards compatibility was an issue.
- The ability to open reports in an external browser. This was necessitated by the changes to report generation.
- The MSVC 2013 redistributable requirement.
- The "None Specified" language option is no longer available: English is the new default.

12.54.4 Fixed

- The uninstaller not removing the Git repositories used to update the masterlists.
- Miscellaneous crashes due to uncaught exceptions.
- Plugin priorities are now temporarily "inherited" during sorting so that a plugin with a low priority that is made via metadata to load after a plugin with a high priority doesn't cause other plugins with lower priorities to be positioned incorrectly.
- The default language is now correctly set to English.
- Defaults for the online masterlist repository used for Nehrim.
- Endless sorting loop that occurred if some user metadata was disabled.

12.55 0.5.0 - 2014-03-31

- Initial release.

CHAPTER

THIRTEEN

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CHAPTER

FOURTEEN

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14.1 Boost

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14.2 LOOT, libloot, OGDF & Qt

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linked subprograms that the work is specifically designed to require,
such as by intimate data communication or control flow between those
subprograms and other parts of the work.
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