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# Fast Emacs Startup & Package Quickstart

| Operation | Keystroke | Function | Note |
|---|---|---|---|
| **Run Emacs in a fast setup mode**<br><br>See also: ∑ **Customize** | The number of external packages installed have an impact on the time Emacs completes its initialization phase.<br>• As this number grows and the number of directories in the ~/.emacs.d/elpa directory increases, Emacs must process each directory: it places each of them in the load-path and loads the autoloads.el and the -pkg.el of each of them.<br>• PEL is designed to minimize Emacs startup time by using several techniques, but it has no control over the number of elpa sub-directories. With a large number of elope directories, Emacs startup time can increase noticeably.<br>• Emacs supports multiple techniques to reduce this startup time:<br>  • Take advantage of lazy loading, and load the strict minimum, using Emacs autoload mechanism to identify commands that will trigger the loading of the package that implement them. PEL use these techniques intensively.<br>  • Emacs 27 and later support a package-quickstart mechanism that creates a single autoloads.el file for all installed elpa packages, reducing the startup time. A early-init file must be written to take advantage of this technique. PEL supports this mechanism and can create the file.<br>  • Reduce the number of packages. By removing the installed external packages that you do not need you reduce Emacs startup processing. With PEL you can disable the user-options and use **pel-cleanup** to remove the excessive packages and any dependency that is no longer required, placing them in separate directories: the attic directories.<br><br>Even when you take advantage of the techniques describe above, you may find that Emacs starts slower than desired when you use a large number of external packages. At this point you can activate **PEL's Emacs fast startup mode of operation**. This is a special setup PEL creates a pet-bundle directory that contains symlinks to the code of all single directory packages and makes it look like a single package. This reduces Emacs startup further and in some situations this reduction may be drastic. And it can be used along with all above techniques.<br>  • This technique takes advantage of the fact that the name of every Emacs package, function and variables must be distinct.<br>  • To re-organize the elpa directory for fast startup mode, use the **pel-setup-fast** command, bound to **<f11> M-S f** . Then restart Emacs.<br>  • While using PEL/Emacs in fast startup mode of operation, PEL does not support automatic package download and installation.<br>  • Nothing prevents you from using the package.el package management feature during that time but it is not recommended to install or update any package because they will be removed as soon as you return to the normal mode and the customization information may get out-of-sync.<br>  • To return to the normal mode of operation, use the **pel-setup-normal** command, bound to **<f11> M-S n** . You must then restart Emacs.<br>  • In the normal mode, PEL manages downloads and installation and where you can use pea-cleanup to remove packages you no longer need,<br><br>The techniques above allow you to have multiple instances of Emacs processes running simultaneously each within a potentially different environment. One instance can switch the startup mode, and restart to use that new mode, while the previously running instances will continue to be able to operate because PEL ensures that the load-path validity persists after a startup mode change.<br><br>The **pel-setup-info** command, bound to **<f11> M-S ?** and to **<f11> ? e M-S** prints a message describing the currently used startup mode.<br><br>Other techniques exist to speed-up Emacs startup time:<br>  • Emacs can be used with an Emacs daemon. The Emacs process connects to the daemon and the start-up time is normally quite fast.<br>  • You can also build your own instance of Emacs to incorporate a large set of external packages, reducing the startup time.<br>These techniques are not used by all for various reasons. They can also be used with PEL's fast startup<br><br>PEL supports a combination of the fast-startup mode, the PEL dual environment, Emacs package quickstart for Emacs running in terminal or graphics mode. For graphics mode, PEL support the ability to configure the environment of graphics Emacs launched from a GUI application such as Linux file managers, macOS Finder or Windows Explorer. **See the compatibility table at the end of this file.** | | |
| **Open this PDF file.**<br>See also: ∑ **Help/Info** | • **<f11> <f2> S <f1>**<br>• **<f11> M-S <f1>** | (**pel-help-pdf** &optional OPEN-WEB-PAGE) | Open the ∑ **Fast Startup** local PDF. If the prefix argument (like **C-u** or **M--**) is used, then it opens the remote GitHub hosted raw PDF instead. If the **pel-flip-help-pdf-arg** user-option is set it's the other way around. |
| ∑ **Customize fast startup support** | **<f11> M-S <f2>** | (**pel-customize-pel** &optional OTHER-WINDOW) | Customize PEL support for fast startup.<br>• The **pel-compile-pel-bundle-autoload** user-option identifies whether you want the pel-bundle-autoloads.el file to be byte compiled. By default it is not byte-compiled.<br>  • The pel-setup-fast command will force byte compilation of the file if the **pel-compile-pel-bundle-autoload** user-option is turned on.<br>  • This may generate byte compiler warning but will speed up Emacs startup a little more.<br>• If OTHER-WINDOW is non-nil (use **C-u** ), display in other window. |
| | | | |
| **Display current Emacs Startup configuration setup**<br>See also: ∑ **Help/Info** | • **<f11> ? e M-S**<br>• **<f11> M-S ?** | (**pel-setup-info**) | Display current state of PEL setup: whether Emacs startup is used in normal or in fast startup operation mode. |
| **Fast startup control** | PEL provides the **fast startup** mode.<br>In this mode Emacs starts faster because the number of package directories is reduced: PEL creates a bundle of all single directory packages are place all their Emacs Lisp and byte-compile Emacs Lisp files in that bundle directory. PEL provides code that turn this bundle directory as something that looks like a package.el compliant package which is then placed in the load-path instead of all the original packages it replaces. The size reduction of the load-path reduces Emacs startup time. When PEL is used in fast-startup mode it cannot download and install new external package. Return to normal mode to resume the ability to do that.<br><br>PEL provides the following 2 commands:<br>• pel-setup-fast which setup the files and directories for fast startup mode,<br>• pel-setuo-normal which returns the files and directories the way Emacs normally uses them, restoring normal mode of operation.<br><br>After executing these commands it is best to restart Emacs. You could still use it, but some operation may fail if you do not restart it.<br><br>⚠ These 2 commands are not available when Emacs runs in graphics mode and package quick start (available in Emacs ≥ 27) is used.<br>• PEL does support using fast startup mode when graphic Emacs uses package-quickstart but is not able to switch the startup mode.<br>• Use Emacs running in terminal mode or graphics mode without package-quickstart activated to switch startup mode. | | |
| **Enter Fast Startup Mode of Operation** | **<f11> M-S f** | (**pel-setup-fast**) | Prepare the elpa directories and code to speedup Emacs startup.<br>• Prompts before proceeding.<br>• After executing this command it is best to restart Emacs to complete the setup. |
| **Restore Normal Mode** | **<f11> M-S n** | (**pel-setup-normal**) | Restore normal PEL/Emacs operation mode.<br>• Prompts before proceeding.<br>• After executing this command it is best to restart Emacs to complete the setup. |

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| **Customization Data and PEL Dual Env**<br><br>See also:<br>• ∑ Customize<br>• PEL user-manual | By default Emacs stores the customization data inside the Emacs init.el file as Lisp code inside a **custom-set-variable** form.<br>• PEL stores it inside a *separate file*, allowing dynamic selection of several files and storage into VCS independent from the init.el logic.<br>  • By default, PEL stories it inside the file **~/.emacs.d/emacs-customization.el**.<br>  • Normally Emacs makes no distinction between running in terminal mode or graphics mode as far as customization file and external packages are concerned.<br>  • PEL supports the ability to use two different sets of customization files and Elpa package directories: one for Emacs running in terminal/TTY mode, another for Emacs running in graphic mode. This feature is disabled by default. You can activate it using the **pel-setup-dual-environment** command which sets up all files and directories for it.<br>  • Type **<f11> <f2> ?** to see what is the current setup.<br>  • Type **<f11> <f2> M-d** to activate the use of the dual environment using 2 independent customization files and package directories.<br><br>• When using PEL, you must place PEL-specific code inside your init.el file and inside your early-init.el file (used in Emacs ≥ 27).<br>  • PEL installation instruction describe these.<br>  • To take full advantage of PEL features, your init.el file should contain the code described in the **example/init/init-5.el**.<br>  • And for Emacs ≥ 27, your early-init.el should use the code described in the **example/init/early-init.el**.<br>  • PEL will automatically create and install an early-init.el file when you activate package-quickstart with the command **pel-setup-with-quickstart**.<br>  • PEL copies the early-init.el identified by the **pel-early-init-file-template** user-option. The default is example/init/early-init.el. If you want to add logic to your early-init file, then create a file that contains the logic of example-init/early-init.el, add your own logic and identify your file inside the user-option.<br>  • ⚠️ Both init.el and early-init.el templates contain a a User Configuration section that requires manual editing.<br>  • Once these files are in place, please edit the files to verify if the default values of variables in the User Configuration reflect your needs and change them otherwise.<br>  • ☝PEL setup commands listed in this section verify the validity of the init.el and early-init.el (if used) and will report any detected problems.<br>  • These files have identified versions. As PEL code evolves if modifications are required to these files PEL will report the required changes. | | |
| **Display state of PEL dual environment**<br><br>See also: ∑ Help/Info | • **<f11> ? e <f2>**<br>• **<f11> <f2> ?** | (**pel-setup-info-dual-environment**) | Display current PEL customization setup.<br>• Check two independent customization files for terminal/tty and graphics mode are requested and if so check if they are setup properly.<br>• Report an error and list problems if there are any, otherwise display the current setup. |
| **Activate PEL dual environment** | **<f11> <f2> M-d** | (**pel-setup-dual-environment**) | Setup Emacs environment to support 2 independent customization.<br>• Prompts before proceeding.<br>• Report any detected problems before proceeding.<br>• Automatically edits your init.el and early-init.el, changing the values of PEL control variables that can duly be changed automatically by PEL.<br>• If you run this command from Emacs running in graphics mode, the command will recommend to restart Emacs to take advantage of the graphics-specific environment. |
| **Package Quickstart Control for Emacs ≥ 27** | Emacs 27 introduced the package quickstart feature. When this feature is used, Emacs creates a package-quickstart.el file in the Emacs user directory. This file holds the auto-load logic extracted from **all** package files. When Emacs ≥ 27 detects the presence of this file it uses it instead of scanning the information from all elpa package directories. This speeds Emacs startup.<br><br>On Emacs ≥ 27 , PEL supports the 4 different combination of setups, listed below in decreasing order of startup time:<br>  • normal mode<br>  • normal mode with Emacs package quickstart<br>  • PEL fast startup<br>  • PEL fast startup with Emacs package quickstart<br><br>To activate Emacs package quickstart you must create a early-init.el file and create the package-quickstart.el file using the package-quickstart-refresh command. PEL provides logic that takes cares of this and can create all the files while also supporting the PEL fast startup mode and the dual independent terminal/graphics customization.<br>• PEL provides a fully functional copy of early-init.el that will work with PEL's features and is located inside the example/init directory.<br>  • That file name is identified by the **pel-early-init-with-package-quickstart** user-option. If you want to create your own copy of that file and add your content then update the user-option with new file name.<br>  • Since you may also want to use a early-init.el file for other purposes when package-quickstart is not used, you may provide the name of that file in the **pel-early-init-without-package-quickstart** user-option. PEL will use that file as the early-init.el when you request to disable package quickstart feature.<br>  • Use the **<f11> M-S <f2>** key sequence to open the appropriate customization buffer.<br>• PEL provides the following 2 commands to setup Emacs ≥ 27 environment to support package quickstart or to remove it. These commands handle the PEL fast-startup mode and the dual independent customization for terminal and graphics mode:<br>  • pel-setup-with-quickstart activates the package quickstart mechanism and refreshes the files.<br>  • pel-setup-no-quickstart disables the package quickstart mechanism. | | |
| **Activate package quickstart** | **<f11> M-S q** | (**pel-setup-with-quickstart**) | Activate package quickstart for current context.<br>• The context includes the PEL startup mode and PEL's ability to deal with independent customization for terminal and graphics mode.<br>• This function copies the file identified by the user-option variable 'pel-early-init-with-package-quickstart' your early-init.el and creates or refreshes the package-quickstart.el file(s).<br>☝ When Emacs is running in normal mode, execute this command to refresh the package-quickstart file(s) after you install new external package. |
| **Disable package quickstart** | **<f11> M-S M-q** | (**pel-setup-no-quickstart**) | Disable package quickstart.<br>Support PEL startup modes and PEL dual independent customization files. |

### Combinations of PEL Startup Modes, Dual Environment, Package quickstart, Emacs UI mode and Process Launching

<table>
<tr><th>Package Quickstart</th><th>Dual Env</th><th>Emacs UI Mode</th><th>Normal startup</th><th>Fast startup</th></tr>
<tr><td rowspan="4">Not used</td><td rowspan="3">Not Used</td><td>terminal/ TTY</td><td>Standard Emacs- nothing special - Everything works.</td><td>Everything works.</td></tr>
<tr><td>graphic - launched from a shell</td><td>Standard Emacs- nothing special - Everything works.</td><td>Everything works.</td></tr>
<tr><td>graphic launched from a GUI app</td><td colspan="2">Everything works.<br><br>⚠ <u>Note1:</u> Possibly required customization required before being able to detect GUI App launched graphical Emacs:<br>1. PEL uses the presence of the special environment variable “_” to identify a GUI App launching of Emacs and activate the environment specified by PEL’s user-option variable pel-gui-process-environment.<br>• If your OS/shell does not define the “_” environment variable but always defines another environment variable that is not part of the GUI App launched environment then change the pel-shell-detection-envvar user-option to the name of that environment variable.<br>• If nothing is available for your OS/shell then select on environment name and define it inside your shell’s startup script and identify the name of that environment variable inside pel-shell-detection-envvar.<br>• Use <code><f11> M-s <f2></code> to open the customization buffer that will allow to modify these user-options.</td></tr>
<tr><td rowspan="3">Used</td><td>terminal/ TTY</td><td>Everything works.</td><td>Everything works.</td></tr>
<tr><td>graphic - launched from a shell</td><td>Everything works.</td><td>Everything works.</td></tr>
<tr><td>graphic launched from a GUI app</td><td colspan="2">Everything works.<br><br>⚠ Possibly required customization required before being able to detect GUI App launched graphical Emacs: See Note 1 above.</td></tr>
<tr><td rowspan="5">Used</td><td rowspan="3">Not Used</td><td>terminal/ TTY</td><td>Everything works.</td><td>Everything works.</td></tr>
<tr><td>graphic - launched from a shell</td><td>Everything works.</td><td>Everything works.</td></tr>
<tr><td>graphic launched from a GUI app</td><td colspan="2">Everything works.<br><br>⚠ Possibly required customization required before being able to detect GUI App launched graphical Emacs: See Note 1 above.</td></tr>
<tr><td rowspan="2">Used</td><td>terminal/ TTY</td><td colspan="2">Everything works.<br><br>⚠ <u>Note 2</u>: Possibly required manual editing of the early-init.el file:<br>1. If you want to use one of these modes and want to select a customization file that differs from PEL’s default then you must edit the early-init.el to identify the name of your customization file even if you have modified the custom-file user-option.<br>• PEL default value is: ~/.emacs.d/emacs-customization[-graphics].el</td></tr>
<tr><td>graphic - launched from a shell</td><td colspan="2">Works with the following limitations (<u>Limitations #1</u>):<br>• Verifications of the environment in graphics mode when package quickstart is used is limited.<br>• 💻 In package quickstart mode PEL cannot yet distinguish the if the elpa is a symlink or not.<br>• The commands to switch startup modes (pel-setup-fast and pel-setup-normal are not available.<br>• 💻 That’s caused by PEL inability to get access to the original value of package-user-dir when the package quickstart is used.<br>• Work-around: use Emacs in any other other mode to perform the switch:<br>• use the terminal mode or switch package quickstart off to perform the switch.<br><br>⚠ Possibly required manual editing of the early-init.el file: See Note 2 above.</td></tr>
<tr><td>graphic launched from a GUI app</td><td colspan="2">Works with the same Limitations #1 as above.<br><br>⚠ Possibly required manual editing of the early-init.el file: See Note 2 above.<br>⚠ Possibly required customization required before being able to detect GUI App launched graphical Emacs: See Note 1 above.</td></tr>
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