

# Emacs 26 特性

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<b>18 Lisp Changes in Emacs 26.1</b>	<b>41</b>
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## 1 本文档说明

这是 Emacs 26 版本发布说明的中文翻译版本：

GNU Emacs NEWS – history of user-visible changes.

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Please send Emacs bug reports to [bug-gnu-emacs@gnu.org](mailto:bug-gnu-emacs@gnu.org). If possible, use `M-x report-emacs-bug`.

This file is about changes in Emacs version 26.

See file HISTORY for a list of GNU Emacs versions and release dates. See files NEWS.25, NEWS.24, ..., NEWS.18, and NEWS.1-17 for changes in older Emacs versions.

You can narrow news to a specific version by calling `'view-emacs-news'` with a prefix argument or by typing `C-u C-h C-n`.

## 2 Emacs 26.2 安装变化

### 2.1 使用`'--with-xwidgets'` 参数构建 Emacs 需要依赖 WebKit2

To build Emacs with xwidgets support, you will need to install the `webkit2gtk-4.0` package; version 2.12 or later is required. (This change was actually made in Emacs 26.1, but was not called out in its NEWS.)

### **3 Startup Changes in Emacs 26.2**

### **4 Changes in Emacs 26.2**

### **5 Editing Changes in Emacs 26.2**

### **6 Changes in Specialized Modes and Packages in Emacs 26.2**

#### **6.1 Gnus**

---

##### **6.1.1 Mailutils movemail will now be used if found at runtime.**

The default value of mail-source-movemail-program is now "movemail". This ensures that the movemail program from GNU Mailutils will be used if found in 'exec-path', even if it was not found at build time. To use a different program, customize mail-source-movemail-program to the absolute file name of the desired executable.

#### **6.2 Shell mode**

---

##### **6.2.1 Shell mode buffers now have 'scroll-conservatively' set to 101.**

This is so as to better emulate the scrolling behavior of a text terminal when new output is added to the screen buffer. To get back the previous behavior, reset 'scroll-conservatively' to zero (or any other value you like) in a function and add it to 'shell-mode-hook'. (This change was actually made in Emacs 26.1, but was not called out in its NEWS.)

#### **6.3 VC**

##### **6.3.1 VC support for Mercurial was improved.**

Emacs now avoids invoking 'hg' as much as possible, for faster operation. (This and the following changes were actually made in Emacs 26.1, but were not called out in its NEWS.)

---

1. New vc-hg options. The new option 'vc-hg-parse-hg-data-structures' controls whether vc-hg will try parsing the Mercurial data structures directly instead of running 'hg'; it defaults to t (set to nil if you want the pre-26.1 behavior). The new option 'vc-hg-symbolic-revision-styles' controls how versions in a Mercurial repository are presented symbolically on the mode line. The new option 'vc-hg-use-file-version-for-mode-line-version' controls whether the version shown on the mode line is that of the visited file or of the repository working copy.

—

2. Display of Mercurial revisions in the mode-line has changed. Previously, the mode line displayed the local number (1, 2, 3, ...) of the revision. Starting with Emacs 26.1, the default has changed, and it now shows the global revision number, in the form of its changeset hash value. To get back the previous behavior, customize the new option 'vc-hg-symbolic-revision-styles' to the value '("{rev}")'.

## **7 New Modes and Packages in Emacs 26.2**

## **8 Incompatible Lisp Changes in Emacs 26.2**

## **9 Lisp Changes in Emacs 26.2**

## **10 Changes in Emacs 26.2 on Non-Free Operating Systems**

## **11 Installation Changes in Emacs 26.1**

### **11.1 By default libgnutls is now required when building Emacs.**

Use 'configure --with-gnutls=no' to build even when GnuTLS is missing.

### **11.2 GnuTLS version 2.12.2 or later is now required, instead of merely**

version 2.6.6 or later.

### **11.3 The new option 'configure --with-mailutils' causes Emacs to rely on**

GNU Mailutils to retrieve email. It is recommended, and is the default if GNU Mailutils is installed. When `--with-mailutils` is not in effect, the Emacs build procedure by default continues to build and install a limited 'movemail' substitute that retrieves POP3 email only via insecure channels. To avoid this problem, use either `--with-mailutils` or `--without-pop` when configuring; `--without-pop` is the default on platforms other than native MS-Windows.

### **11.4 The new option 'configure --enable-gcc-warnings=warn-only' causes**

GCC to issue warnings without stopping the build. This behavior is now the default in developer builds. As before, use `'--disable-gcc-warnings'` to suppress GCC's warnings, and `'--enable-gcc-warnings'` to stop the build if GCC issues warnings.

### **11.5 When GCC warnings are enabled, '--enable-check-lisp-object-type' is**

now enabled by default when configuring.

### **11.6 The Emacs server now has socket-launching support. This allows**

socket based activation, where an external process like `systemd` can invoke the Emacs server process upon a socket connection event and hand the socket over to Emacs. Emacs uses this socket to service `emacsclient` commands. This new functionality can be disabled with the configure option `'--disable-libsystemd'`.

### **11.7 A systemd user unit file is provided. Use it in the standard way:**

`'systemctl --user enable emacs'`. (If your Emacs is installed in a non-standard location, you may need to copy the `emacs.service` file to eg `~/.config/systemd/user/`)

### **11.8 New configure option ‘--disable-build-details’ attempts to build an**

Emacs that is more likely to be reproducible; that is, if you build and install Emacs twice, the second Emacs is a copy of the first. Deterministic builds omit the build date from the output of the ‘emacs-version’ and ‘erc-cmd-SV’ functions, and the leave the following variables nil: ‘emacs-build-system’, ‘emacs-build-time’, ‘erc-emacs-build-time’.

### **11.9 Emacs can now be built with support for Little CMS.**

If the lcms2 library is installed, Emacs will enable features built on top of that library. The new configure option ‘--without-lcms2’ can be used to build without lcms2 support even if it is installed. Emacs linked to Little CMS exposes color management functions in Lisp: the color metrics ‘lcms-cie-de2000’ and ‘lcms-cam02-ucs’, as well as functions for conversion to and from CIE CAM02 and CAM02-UCS.

### **11.10 The configure option ‘--with-gameuser’ now defaults to ‘no’,**

as this appears to be the most common configuration in practice. When it is ‘no’, the shared game directory and the auxiliary program update-game-score are no longer needed and are not installed.

### **11.11 Emacs no longer works on IRIX. We expect that Emacs users are not**

affected by this, as SGI stopped supporting IRIX in December 2013.

## **12 Startup Changes in Emacs 26.1**

### **12.1 New option ‘-fg-daemon’. This is the same as ‘-daemon’, except**

it runs in the foreground and does not fork. This is intended for modern init systems such as systemd, which manage many of the traditional aspects of daemon behavior themselves. ‘-bg-daemon’ is now an alias for ‘-daemon’.

## **12.2 New option ‘`–module-assertions`’.**

When given this option, Emacs will perform expensive correctness checks when dealing with dynamic modules. This is intended for module authors that wish to verify that their module conforms to the module requirements. The option makes Emacs abort if a module-related assertion triggers.

## **12.3 Emacs now supports 24-bit colors on capable text terminals.**

Terminal is automatically initialized to use 24-bit colors if the required capabilities are found in terminfo. See the FAQ node “(efaq) Colors on a TTY” for more information.

## **12.4 Emacs now obeys the X resource “`scrollBar`” at startup.**

The effect is similar to that of “`toolBar`” resource on the tool bar.

# **13 Changes in Emacs 26.1**

## **13.1 Option ‘`buffer-offer-save`’ can be set to new value, ‘`always`’. When**

set to ‘`always`’, the command ‘`save-some-buffers`’ will always offer this buffer for saving.

## **13.2 Security vulnerability related to Enriched Text mode is removed.**

### **13.2.1 Enriched Text mode does not evaluate Lisp in ‘`display`’ properties.**

This feature allows saving ‘`display`’ properties as part of text. Emacs ‘`display`’ properties support evaluation of arbitrary Lisp forms as part of processing the property for display, so displaying Enriched Text could be vulnerable to executing arbitrary malicious Lisp code included in the text (e.g., sent as part of an email message). Therefore, execution of arbitrary Lisp forms in ‘`display`’ properties decoded by Enriched Text mode is now disabled by default. Customize the new option ‘`enriched-allow-eval-in-display-props`’ to a non-nil value to allow Lisp evaluation in decoded ‘`display`’ properties.

This vulnerability was introduced in Emacs 21.1. To work around that in Emacs versions before 25.3, append the following to your `~/.emacs` init file:

```
(eval-after-load "enriched" '(defun enriched-decode-display-prop (start
end &optional param) (list start end)))
```

### **13.3 Functions in 'write-content-functions' can fully short-circuit the**

'save-buffer' process. Previously, saving a buffer that was not visiting a file would always prompt for a file name. Now it only does so if 'write-content-functions' is nil (or all its functions return nil).

### **13.4 New variable 'executable-prefix-env' for inserting magic signatures.**

This variable affects the format of the interpreter magic number inserted by 'executable-set-magic'. If non-nil, the magic number now takes the form "`#!/usr/bin/env interpreter`", otherwise the value determined by 'executable-prefix', which is by default "`#!/path/to/interpreter`". By default, 'executable-prefix-env' is nil, so the default behavior is not changed.

### **13.5 The variable 'emacs-version' no longer includes the build number.**

This is now stored separately in a new variable, 'emacs-build-number'.

### **13.6 Emacs now provides a limited form of concurrency with Lisp threads.**

Concurrency in Emacs Lisp is "mostly cooperative", meaning that Emacs will only switch execution between threads at well-defined times: when Emacs waits for input, during blocking operations related to threads (such as mutex locking), or when the current thread explicitly yields. Global variables are shared among all threads, but a 'let' binding is thread-local. Each thread also has its own current buffer and its own match data.

See the chapter "(elisp) Threads" in the ELisp manual for full documentation of these facilities.

### **13.7 The new user variable 'electric-quote-chars' provides a list**

of curved quotes for 'electric-quote-mode', allowing user to choose the types of quotes to be used.

### **13.8 The new user option 'electric-quote-context-sensitive' makes**

'electric-quote-mode' context sensitive. If it is non-nil, you can type an ASCII apostrophe to insert an opening or closing quote, depending on context. Emacs will replace the apostrophe by an opening quote character at the beginning of the buffer, the beginning of a line, after a whitespace character, and after an opening parenthesis; and it will replace the apostrophe by a closing quote character in all other cases.

### **13.9 The new variable 'electric-quote-inhibit-functions' controls when**

to disable electric quoting based on context. Major modes can add functions to this list; Emacs will temporarily disable 'electric-quote-mode' whenever any of the functions returns non-nil. This can be used by major modes that derive from 'text-mode' but allow inline code segments, such as 'markdown-mode'.

### **13.10 The new user variable 'dired-omit-case-fold' allows the user to**

customize the case-sensitivity of dired-omit-mode. It defaults to the same sensitivity as that of the filesystem for the corresponding dired buffer.

### **13.11 Emacs now uses double buffering to reduce flicker when editing and**

resizing graphical Emacs frames on the X Window System. This support requires the DOUBLE-BUFFER extension, which major X servers have supported for many years. If your system has this extension, but an Emacs built with double buffering misbehaves on some displays you use, you can disable the feature by adding

`'(inhibit-double-buffering . t)`



to default-frame-alist. Or inject this parameter into the selected frame by evaluating this form:

```
(modify-frame-parameters nil '((inhibit-double-buffering . t)))
```

**13.12 The customization group 'wp', whose label was "text", is now**

deprecated. Use the new group 'text', which inherits from 'wp', instead.

**13.13 The new function 'call-shell-region' executes a command in an**

inferior shell with the buffer region as input.

**13.14 The new user option 'shell-command-dont-erase-buffer' controls**

if the output buffer is erased between shell commands; if non-nil, the output buffer is not erased; this variable also controls where to set the point in the output buffer: beginning of the output, end of the buffer or save the point. When 'shell-command-dont-erase-buffer' is nil, the default value, the behavior of 'shell-command', 'shell-command-on-region' and 'async-shell-command' is as usual.

**13.15 The new user option 'async-shell-command-display-buffer' controls**

whether the output buffer of an asynchronous command is shown immediately, or only when there is output.

**13.16 New user option 'mouse-select-region-move-to-beginning'.**

This option controls the position of point when double-clicking mouse-1 on the end of a parenthetical grouping or string-delimiter: the default value nil keeps point at the end of the region, setting it to non-nil moves point to the beginning of the region.

**13.17 New user option 'mouse-drag-and-drop-region'.**

This option allows you to drag the entire region of text to another place or another buffer. Its behavior is customizable via the new options 'mouse-

drag-and-drop-region-cut-when-buffers-differ', 'mouse-drag-and-drop-region-show-tooltip', and 'mouse-drag-and-drop-region-show-cursor'.

### **13.18 The new user option 'confirm-kill-processes' allows the user to**

skip a confirmation prompt for killing subprocesses when exiting Emacs. When set to t (the default), Emacs will prompt for confirmation before killing subprocesses on exit, which is the same behavior as before.

### **13.19 'find-library-name' will now fall back on looking at 'load-history'**

to try to locate libraries that have been loaded with an explicit path outside 'load-path'.

### **13.20 Faces in 'minibuffer-prompt-properties' no longer overwrite properties**

in the text in functions like 'read-from-minibuffer', but instead are added to the end of the face list. This allows users to say things like '(read-from-minibuffer (propertize "Enter something: " 'face 'bold))'.

### **13.21 The new variable 'extended-command-suggest-shorter' has been added**

to control whether to suggest shorter 'M-x' commands or not.

### **13.22 icomplete now respects 'completion-ignored-extensions'**

### **13.23 Non-breaking hyphens are now displayed with the 'nobreak-hyphen'**

face instead of the 'escape-glyph' face.

### **13.24 Approximations to quotes are now displayed with the new 'homoglyph'**

face instead of the 'escape-glyph' face.

### **13.25 New face 'header-line-highlight'.**

This face is the header-line analogue of 'mode-line-highlight'; it should be the preferred mouse-face for mouse-sensitive elements in the header line.

### **13.26 'C-x h' ('mark-whole-buffer') will now avoid marking the prompt**

part of minibuffers.

### **13.27 'fill-paragraph' no longer marks the buffer as changed unless it**

actually changed something.

### **13.28 The locale language name 'ca' is now mapped to the language**

environment 'Catalan', which has been added.

### **13.29 'align-regexp' has a separate history for its interactive argument.**

'align-regexp' no longer shares its history with all other history-less functions that use 'read-string'.

### **13.30 The networking code has been reworked so that it's more**

asynchronous than it was (when specifying :nowait t in 'make-network-process'). How asynchronous it is varies based on the capabilities of the system, but on a typical GNU/Linux system the DNS resolution, the connection, and (for TLS streams) the TLS negotiation are all done without blocking the main Emacs thread. To get asynchronous TLS, the TLS boot parameters have to be passed in (see the manual for details).

Certain process oriented functions (like 'process-datagram-address') will block until socket setup has been performed. The recommended way to deal with asynchronous sockets is to avoid interacting with them until they have changed status to "run". This is most easily done from a process sentinel.

### **13.31 'make-network-process' and 'open-network-stream' sometimes allowed**

:service to be an integer string (e.g., :service "993") and sometimes required an integer (e.g., :service 993). This difference has been eliminated, and integer strings work everywhere.

### **13.32 It is possible to disable attempted recovery on fatal signals.**

Two new variables support disabling attempts to recover from stack overflow and to avoid automatic auto-save when Emacs is delivered a fatal signal. 'attempt-stack-overflow-recovery', if set to nil, will disable attempts to recover from C stack overflows; Emacs will then crash as with any other fatal signal. 'attempt-orderly-shutdown-on-fatal-signal', if set to nil, will disable attempts to auto-save the session and shut down in an orderly fashion when Emacs receives a fatal signal; instead, Emacs will terminate immediately. Both variables are non-nil by default. These variables are for users who would like to avoid the small probability of data corruption due to techniques Emacs uses to recover in these situations.

### **13.33 File local and directory local variables are now initialized each**

time the major mode is set, not just when the file is first visited. These local variables will thus not vanish on setting a major mode.

### **13.34 A second dir-local file (.dir-locals-2.el) is now accepted.**

See the doc string of 'dir-locals-file' for more information.

### **13.35 Connection-local variables can be used to specify local variables**

with a value depending on the connected remote server. For details, see the node "(elisp) Connection Local Variables" in the ELisp manual.

### **13.36 International domain names (IDNA) are now encoded via the new**

puny.el library, so that one can visit Web sites with non-ASCII URLs.

**13.37 The new 'list-timers' command lists all active timers in a buffer,**

where you can cancel them with the 'c' command.

**13.38 'switch-to-buffer-preserve-window-point' now defaults to t.**

Applications that call 'switch-to-buffer' and want to show the buffer at the position of its point should use 'pop-to-buffer-same-window' in lieu of 'switch-to-buffer'.

**13.39 The new variable 'debugger-stack-frame-as-list' allows displaying**

all call stack frames in a Lisp backtrace buffer as lists. Both debug.el and edebug.el have been updated to heed to this variable.

**13.40 Values in call stack frames are now displayed using 'cl-prin1'.**

The old behavior of using 'prin1' can be restored by customizing the new option 'debugger-print-function'.

**13.41 NUL bytes in text copied to the system clipboard are now replaced with "\0".**

**13.42 The new variable 'x-ctrl-keysym' has been added to the existing**

roster of X keysyms. It can be used in combination with another variable of this kind to swap modifiers in Emacs.

**13.43 New input methods: 'cyrillic-tuvan', 'polish-prefix', 'uzbek-cyrillic'.**

**13.44 The 'dutch' input method no longer attempts to support Turkish too.**

Also, it no longer converts 'IJ' and 'ij' to the compatibility characters U+0132 LATIN CAPITAL LIGATURE IJ and U+0133 LATIN SMALL LIGATURE IJ.

### 13.45 File name quoting by adding the prefix `"/:"` is now possible for the

local part of a remote file name. Thus, if you have a directory named `"~"` on the remote host `"foo"`, you can prevent it from being substituted by a home directory by writing it as `"/foo::~~/file"`.

### 13.46 The new variable `'maximum-scroll-margin'` allows having effective

settings of `'scroll-margin'` up to half the window size, instead of always restricting the margin to a quarter of the window.

### 13.47 Emacs can scroll horizontally using mouse, touchpad, and trackbar.

You can enable this by customizing `'mouse-wheel-tilt-scroll'`. If you want to reverse the direction of the scroll, customize `'mouse-wheel-flip-direction'`.

### 13.48 The default GnuTLS priority string now includes `%DUMBFW`.

This is to avoid bad behavior in some firewalls, which causes the connection to be closed by the remote host.

### 13.49 Emacsclient changes

#### 13.49.1 Emacsclient has a new option `'-u'` / `'--suppress-output'`.

This option suppresses display of return values from the server process.

#### 13.49.2 Emacsclient has a new option `'-T'` / `'--tramp'`.

This helps with using a local Emacs session as the server for a remote emacsclient. With appropriate setup, one can now set the `EDITOR` environment variable on a remote machine to emacsclient, and use the local Emacs to edit remote files via Tramp. See the node `"(emacs) emacsclient Options"` in the user manual for the details.

#### 13.49.3 Emacsclient now accepts command-line options in `ALTERNATEEDITOR`

and `'-alternate-editor'`. For example, `ALTERNATEEDITOR="emacs -Q -nw"`. Arguments may be quoted "like this", so that for example an absolute

path containing a space may be specified; quote escaping is not supported.

### 13.50 New user option 'dig-program-options' and extended functionality

for DNS-querying functions 'nslookup-host', 'dns-lookup-host', and 'run-dig'. Each function now accepts an optional name server argument interactively (with a prefix argument) and non-interactively.

### 13.51 'describe-key-briefly' now ignores mouse movement events.

### 13.52 The new variable 'eval-expression-print-maximum-character' prevents

large integers from being displayed as characters by 'M-:' and similar commands.

### 13.53 Two new commands for finding the source code of Emacs Lisp

libraries: 'find-library-other-window' and 'find-library-other-frame'.

### 13.54 The new variable 'display-raw-bytes-as-hex' allows you to change

the display of raw bytes from octal to hex.

### 13.55 You can now provide explicit field numbers in format specifiers.

For example, '(format "%2\$s %1\$s %2\$s" "X" "Y")' produces "Y X Y".

### 13.56 Emacs 支持在 Buffer 里显示行号 (可选项)

这个显示行号的原生支持与之前的 **linum-mode** 提供的功能一样，但它更快。并且，不会因为行号的显示而占用边距。通过配置 Buffer 本地变量 **display-line-numbers** 去开启这个行号显示项。或者还可以通过打开 **display-line-numbers-mode** 这个 minor 模式也能达到相同效果。还有一种方式，那就是打开全局的 **global-display-line-numbers-mode** 模式。当这些模式打开后，配置 **display-line-numbers-type** 的值会与 **display-line-numbers** 的值相同。

行号不会显示在所有的 minibuffer 的窗口以及提示窗口，因为他们不是用于此处。

Lisp 程序可以通过设置 **display-line-numbers-disable** 的文本属性或者屏幕当前行第一个字符的属性来关闭此功能。做成可配置的包目的是为了更好地做显示控制。Lisp 程序想知道多少屏幕宽度被行号所占用，可以通过 **line-number-display-width** 这个函数来获取。**linum-mode** 和其他类似的包可以废弃，不再使用。Emacs 官方推荐使用新的原生方法来显示行号。

### 13.57 添加‘arabic-shaper-ZWNJ-handling’ 用户选项用来处理 Arabic 文本渲染中的 ZWNJ 问题

## 14 Emacs 26.1 中编辑操作的变化

### 14.1 新加变量‘column-number-indicator-zero-based’.

Traditionally, in Column Number mode, the displayed column number counts from zero starting at the left margin of the window. This behavior is now controlled by ‘column-number-indicator-zero-based’. If you would prefer for the displayed column number to count from one, you may set this variable to nil. (Behind the scenes, there is now a new mode line construct, ‘%C’, which operates exactly as ‘%c’ does except that it counts from one.)

### 14.2 New single-line horizontal scrolling mode.

The ‘auto-hscroll-mode’ variable can now have a new special value, ‘current-line’, which causes only the line where the cursor is displayed to be horizontally scrolled when lines are truncated on display and point moves outside the left or right window margin.

### 14.3 New mode line constructs ‘%o’ and ‘%q’, and user option

‘mode-line-percent-position’. ‘%o’ displays the “degree of travel” of the window through the buffer. Unlike the default ‘%p’, this percentage approaches 100% as the window approaches the end of the buffer. ‘%q’ displays the percentage offsets of both the start and the end of the window, e.g. “5-17%”. The new option ‘mode-line-percent-position’ makes it easier to switch between ‘%p’, ‘%P’, and these new constructs.



#### **14.4 Two new user options 'list-matching-lines-jump-to-current-line' and**

'list-matching-lines-current-line-face' to show the current line highlighted in **Occur** buffer.

#### **14.5 The 'occur' command can now operate on the region.**

#### **14.6 New bindings for 'query-replace-map'.**

'undo', undo the last replacement; bound to 'u'. 'undo-all', undo all replacements; bound to 'U'.

#### **14.7 'delete-trailing-whitespace' deletes whitespace after form feed.**

In modes where form feed was treated as a whitespace character, 'delete-trailing-whitespace' would keep lines containing it unchanged. It now deletes whitespace after the last form feed thus behaving the same as in modes where the character is not whitespace.

#### **14.8 Emacs no longer prompts about editing a changed file when the file's**

content is unchanged. Instead of only checking the modification time, Emacs now also checks the file's actual content before prompting the user.

#### **14.9 Various casing improvements.**

##### **14.9.1 'upcase', 'upcase-region' et al. convert title case characters**

(such as `Ungla`) into their upper case form (such as `UNGLA`).

##### **14.9.2 'capitalize', 'upcase-initials' et al. make use of title-case forms**

of initial characters (correctly producing for example `Ungla` instead of incorrect `ungla`).

### **14.9.3 Characters which turn into multiple ones when cased are correctly handled.**

For example, fi ligature is converted to FI when upper cased.

### **14.9.4 Greek small sigma is correctly handled when at the end of the word.**

Strings such as  $\text{O}\Sigma\text{O}\Sigma$  are now correctly converted to  $\text{O}$  when capitalized instead of incorrect  $\text{O}$  (compare lowercase sigma at the end of the word).

### **14.10 Emacs can now auto-save buffers to visited files in a more robust**

manner via the new mode 'auto-save-visited-mode'. Unlike 'auto-save-visited-file-name', this mode uses the normal saving procedure and therefore obeys saving hooks. 'auto-save-visited-file-name' is now obsolete.

### **14.11 New behavior of 'mark-defun'.**

Prefix argument selects that many (or that many more) defuns. Negative prefix arg flips the direction of selection. Also, 'mark-defun' between defuns correctly selects N following defuns (or -N previous for negative arguments). Finally, comments preceding the defun are selected unless they are separated from the defun by a blank line.

### **14.12 New command 'replace-buffer-contents'.**

This command replaces the contents of the accessible portion of the current buffer with the contents of the accessible portion of a different buffer while keeping point, mark, markers, and text properties as intact as possible.

### **14.13 New commands 'apropos-local-variable' and 'apropos-local-value'.**

These are buffer-local versions of 'apropos-variable' and 'apropos-value', respectively. They show buffer-local variables whose names and values, respectively, match a given pattern.

#### **14.14 More user control of reordering bidirectional text for display.**

The two new variables, 'bidi-paragraph-start-re' and 'bidi-paragraph-separate-re', allow customization of what exactly are paragraphs, for the purposes of bidirectional display.

#### **14.15 New variable 'x-wait-for-event-timeout'.**

This controls how long Emacs will wait for updates to the graphical state to take effect (making a frame visible, for example).

### **15 Changes in Specialized Modes and Packages in Emacs 26.1**

#### **15.1 Emacs 26.1 comes with Org v9.1.6.**

See the file ORG-NEWS for user-visible changes in Org.

#### **15.2 New function 'cl-generic-p'.**

#### **15.3 Dired**

##### **15.3.1 You can answer 'all' in 'dired-do-delete' to delete recursively all**

remaining directories without more prompts.

##### **15.3.2 Dired supports wildcards in the directory part of the file names.**

##### **15.3.3 You can now use '?' in 'dired-do-shell-command'.**

It gets replaced by the current file name, like ' ? '.

##### **15.3.4 A new option 'dired-always-read-filesystem' defaulting to nil.**

If non-nil, buffers visiting files are reverted before they are searched; for instance, in 'dired-mark-files-containing-regexp' a non-nil value of this option means the file is revisited in a temporary buffer; this temporary buffer is the actual buffer searched: the original buffer visiting the file is not modified.

### **15.3.5 Users can now customize mouse clicks in Direed in a more flexible way.**

The new command 'direed-mouse-find-file' can be bound to a mouse click and used to visit files/directories in Direed in the selected window. The new command 'direed-mouse-find-file-other-frame' similarly visits files/directories in another frame. You can write your own commands that invoke 'direed-mouse-find-file' with non-default optional arguments, to tailor the effects of mouse clicks on file names in Direed buffers.

**15.3.6 In wdired, when editing files to contain slash characters,** the resulting directories are automatically created. Whether to do this is controlled by the 'wdired-create-parent-directories' variable.

### **15.3.7 'W' is now bound to 'browse-url-of-dired-file', and is useful for**

viewing HTML files and the like.

### **15.3.8 New variable 'direed-clean-confirm-killing-deleted-buffers'**

controls whether Direed asks to kill buffers visiting deleted files and directories. The default is t, so Direed asks for confirmation, to keep previous behavior.

### **15.4 html2text is now marked obsolete.**

### **15.5 smerge-refine-regions can refine regions in separate buffers.**

### **15.6 Info menu and index completion uses substring completion by default.**

This can be customized via the 'info-menu' category in 'completion-category-overrides'.

### **15.7 The ancestor buffer is shown by default in 3-way merges.**

A new option 'ediff-show-ancestor' and a new toggle 'ediff-toggle-show-ancestor'.

## **15.8   TeX: Add luatex and xetex as alternatives to pdftex**

## **15.9   Electric-Buffer-menu**

### **15.9.1   Key 'U' is bound to 'Buffer-menu-unmark-all' and key 'M-DEL' is**

bound to 'Buffer-menu-unmark-all-buffers'.

## **15.10   hideshow mode got four key bindings that are analogous to outline**

mode bindings: 'C-c @ C-a', 'C-c @ C-t', 'C-c @ C-d', and 'C-c @ C-e'.

## **15.11   bs**

### **15.11.1   Two new commands 'bs-unmark-all', bound to 'U', and 'bs-unmark-previous', bound to <backspace>.**

## **15.12   Buffer-menu**

### **15.12.1   Two new commands 'Buffer-menu-unmark-all', bound to 'U' and**

'Buffer-menu-unmark-all-buffers', bound to 'M-DEL'.

## **15.13   Checkdoc**

### **15.13.1   'checkdoc-arguments-in-order-flag' now defaults to nil.**

## **15.14   Gnus**

### **15.14.1   The ~/.newsrsrc file will now only be saved if the native select**

method is an NNTP select method.

### **15.14.2   A new command for sorting articles by readedness marks has been**

added: 'C-c C-s C-m C-m'.

**15.14.3 In 'message-citation-line-format' the '%Z' format is now the time**

zone name instead of the numeric form. The '%z' format continues to be the numeric form. The new behavior is compatible with 'format-time-string'.

**15.15 Ibuffer**

**15.15.1 New command 'ibuffer-jump'.**

**15.15.2 New filter commands 'ibuffer-filter-by-basename', 'ibuffer-filter-by-file-extension', 'ibuffer-filter-by-directory', 'ibuffer-filter-by-starred-name', 'ibuffer-filter-by-modified' and 'ibuffer-filter-by-visiting-file';** bound respectively to 'b', '.', '//', '/\*', '/i' and '/v'.

**15.15.3 Two new commands 'ibuffer-filter-chosen-by-completion' and 'ibuffer-and-filter',** the second bound to '/&'.

**15.15.4 The commands 'ibuffer-pop-filter', 'ibuffer-pop-filter-group', 'ibuffer-or-filter' and 'ibuffer-filter-disable' have the alternative bindings '/<up>', '/S-<up>', '/|' and '/DEL', respectively.**

**15.15.5 The data format specifying filters has been extended to allow**

explicit logical 'and', and a more flexible form for logical 'not'. See 'ibuffer-filtering-qualifiers' doc string for full details.

**15.15.6 A new command 'ibuffer-copy-buffername-as-kill';** bound to 'B'.

**15.15.7 New command 'ibuffer-change-marks';** bound to '\* c'.

**15.15.8 A new command 'ibuffer-mark-by-locked' to mark** all locked buffers; bound to '% L'.

#### **15.15.9 A new option 'ibuffer-locked-char' to indicate**

locked buffers; Ibuffer shows a new column displaying 'ibuffer-locked-char' for locked buffers.

#### **15.15.10 A new command 'ibuffer-unmark-all-marks' to unmark**

all buffers without asking confirmation; bound to 'U'; 'ibuffer-do-replace-regexp' bound to 'r'.

#### **15.15.11 A new command 'ibuffer-mark-by-content-regexp' to mark buffers**

whose content matches a regexp; bound to '% g'.

#### **15.15.12 Two new options 'ibuffer-never-search-content-name' and**

'ibuffer-never-search-content-mode' used by 'ibuffer-mark-by-content-regexp'.

### **15.16 Browse-URL**

#### **15.16.1 Support for opening links to man pages in Man or WoMan mode.**

### **15.17 Comint**

#### **15.17.1 New user option 'comint-move-point-for-matching-input' to control**

where to place point after 'C-c M-r' and 'C-c M-s'.

#### **15.17.2 New user option 'comint-terminfo-terminal'.**

This option allows control of the value of the TERM environment variable Emacs puts into the environment of the Comint mode and its derivatives, such as Shell mode and Compilation Shell minor-mode. The default is "dumb", for compatibility with previous behavior.

## **15.18 Compilation mode**

**15.18.1 Messages from CMake are now recognized.**

**15.18.2 The number of errors, warnings, and informational messages is now**

displayed in the mode line. These are updated as compilation proceeds.

## **15.19 Grep**

**15.19.1 Grep commands will now use GNU grep's '-null' option if**

available, which allows distinguishing the filename from contents if they contain colons. This can be controlled by the new custom option 'grep-use-null-filename-separator'.

**15.19.2 The grep/rgrep/lgrep functions will now ask about saving files**

before running. This is controlled by the 'grep-save-buffers' variable.

## **15.20 Edebug**

**15.20.1 Edebug can be prevented from pausing 1 second after reaching a**

breakpoint (e.g. with "f" and "o") by customizing the new option 'edebug-sit-on-break'.

**15.20.2 New customizable option 'edebug-max-depth'.**

This allows you to enlarge the maximum recursion depth when instrumenting code.

**15.20.3 'edebug-prin1-to-string' now aliases 'cl-prin1-to-string'.**

This means edebug output is affected by variables 'cl-print-readably' and 'cl-print-compiled'. To completely restore the previous printing behavior, use

```
(fset 'edebug-prin1-to-string #'prin1-to-string)
```



## **15.21 Eshell**

### **15.21.1 'eshell-input-filter's value is now a named function**

'eshell-input-filter-default', and has a new custom option 'eshell-input-filter-initial-space' to ignore adding commands prefixed with blank space to eshell history.

## **15.22 EUDC**

### **15.22.1 Backward compatibility support for BBDB versions less than 3**

(i.e., BBDB 2.x) is deprecated and will likely be removed in the next major release of Emacs. Users of BBDB 2.x should plan to upgrade to BBDB 3.x.

## **15.23 eww**

### **15.23.1 New 'M-RET' command for opening a link at point in a new eww buffer.**

### **15.23.2 A new 's' command for switching to another eww buffer via the minibuffer.**

### **15.23.3 The 'o' command ('shr-save-contents') has moved to 'O' to avoid collision**

with the 'o' command from 'image-map'.

### **15.23.4 A new command 'C' ('eww-toggle-colors') can be used to toggle**

whether to use the HTML-specified colors or not. The user can also customize the 'shr-use-colors' variable.

### **15.23.5 Images that are being loaded are now marked with gray**

"placeholder" images of the size specified by the HTML. They are then replaced by the real images asynchronously, which will also now respect width/height HTML specs (unless they specify widths/heights bigger than the current window).

### **15.23.6 The 'w' command on links is now 'shr-maybe-probe-and-copy-url'.**

'shr-copy-url' now only copies the url at point; users who wish to avoid accidentally accessing remote links may rebind 'w' and 'u' in 'eww-link-keymap' to it.

## **15.24 Ido**

### **15.24.1 The commands 'find-alternate-file-other-window',**

'dired-other-window', 'dired-other-frame', and 'display-buffer-other-window' are now remapped to Ido equivalents if Ido mode is active.

## **15.25 Images**

### **15.25.1 Images are automatically scaled before displaying based on the**

'image-scaling-factor' variable (if Emacs supports scaling the images in question).

### **15.25.2 It's now possible to specify aspect-ratio preserving combinations**

of :width/:max-height and :height/:max-width keywords. In either case, the "max" keywords win. (Previously some combinations would, depending on the aspect ratio of the image, just be ignored and in other instances this would lead to the aspect ratio not being preserved.)

### **15.25.3 Images inserted with 'insert-image' and related functions get a**

keymap put into the text properties (or overlays) that span the image. This keymap binds keystrokes for manipulating size and rotation, as well as saving the image to a file. These commands are also available in 'image-mode'.

### **15.25.4 A new library for creating and manipulating SVG images has been**

added. See the "(elisp) SVG Images" section in the ELisp reference manual for details.

**15.25.5 New setf-able function to access and set image parameters is**

provided: 'image-property'.

**15.25.6 New commands 'image-scroll-left' and 'image-scroll-right'**

for 'image-mode' that complement 'image-scroll-up' and 'image-scroll-down': they have the same prefix arg behavior and stop at image boundaries.

**15.26 Image-Dired**

**15.26.1 Now provides a minor mode 'image-dired-minor-mode' which replaces**

the function 'image-dired-setup-dired-keybindings'.

**15.26.2 Thumbnail generation is now asynchronous.**

The number of concurrent processes is limited by the variable 'image-dired-queue-active-limit'.

**15.26.3 'image-dired-thumbnail-storage' has a new option 'standard-large'**

for generating 256x256 thumbnails according to the Thumbnail Managing Standard.

**15.26.4 Inherits movement keys from 'image-mode' for viewing full images.**

This includes the usual char, line, and page movement commands.

**15.26.5 All the -options types have been changed to argument lists**

instead of shell command strings. This change affects 'image-dired-cmd-create-thumbnail-options', 'image-dired-cmd-create-temp-image-options', 'image-dired-cmd-rotate-thumbnail-options', 'image-dired-cmd-rotate-original-options', 'image-dired-cmd-write-exif-data-options', 'image-dired-cmd-read-exif-data-options', and introduces 'image-dired-cmd-pngnq-options', 'image-dired-cmd-pngcrush-options', 'image-dired-cmd-create-standard-thumbnail-options'.

**15.26.6 Recognizes more tools by default, including pngnq-s9 and OptiPNG.**

**15.26.7 'find-file' and related commands now work on thumbnails and**

displayed images, providing a default argument of the original file name via an addition to 'file-name-at-point-functions'.

**15.27 The default 'Info-default-directory-list' no longer checks some obsolete**

directory suffixes (gnu, gnu/lib, gnu/lib/emacs, emacs, lib, lib/emacs) when searching for info directories.

**15.28 The commands that add ChangeLog entries now prefer a VCS root directory**

for the ChangeLog file, if none already exists. Customize 'change-log-directory-files' to nil for the old behavior.

**15.29 Support for non-string values of 'time-stamp-format' has been removed.**

**15.30 Message**

**15.30.1 'message-use-idna' now defaults to t (because Emacs comes with**

built-in IDNA support now).

**15.30.2 When sending HTML messages with embedded images, and you have**

exiftool installed, and you rotate images with EXIF data (i.e., JPEGs), the rotational information will be inserted into the outgoing image in the message. (The original image will not have its orientation affected.)

**15.30.3 The 'message-valid-fqdn-regexp' variable has been removed, since**

there are now top-level domains added all the time. Message will no longer warn about sending emails to top-level domains it hasn't heard about.

#### **15.30.4 'message-beginning-of-line' (bound to 'C-a') understands folded headers.**

In 'visual-line-mode' it will look for the true beginning of a header while in non-'visual-line-mode' it will move the point to the indented header's value.

### **15.31 Package**

#### **15.31.1 The new variable 'package-gnupghome-dir' has been added to control**

where the GnuPG home directory (used for signature verification) is located and whether GnuPG's option '-homedir' is used or not.

#### **15.31.2 Deleting a package no longer respects 'delete-by-moving-to-trash'.**

### **15.32 Python**

#### **15.32.1 The new variable 'python-indent-def-block-scale' has been added.**

It controls the depth of indentation of arguments inside multi-line function signatures.

### **15.33 Tramp**

#### **15.33.1 The method part of remote file names is mandatory now.**

A valid remote file name starts with `"/method:host:"` or `"/method:user@host:"`.

#### **15.33.2 The new pseudo method "-" is a marker for the default method.**

`"/-:"` is the shortest remote file name then.

#### **15.33.3 The command 'tramp-change-syntax' allows you to choose an**

alternative remote file name syntax.

**15.33.4 New connection method "sg", which supports editing files under a**

different group ID.

**15.33.5 New connection method "doas" for OpenBSD hosts.**

**15.33.6 New connection method "gdrive", which allows access to Google**

Drive onsite repositories.

**15.33.7 Gateway methods in Tramp have been removed.**

Instead, the Tramp manual documents how to configure ssh and PuTTY accordingly.

**15.33.8 Setting the "ENV" environment variable in**

'tramp-remote-process-environment' enables reading of shell initialization files.

**15.33.9 Tramp is able now to send SIGINT to remote asynchronous processes.**

**15.33.10 Variable 'tramp-completion-mode' is obsoleted.**

**15.34 'auto-revert-use-notify' is set back to t in 'global-auto-revert-mode'.**

**15.35 JS mode**

**15.35.1 JS mode now sets 'comment-multi-line' to t.**

**15.35.2 New variable 'js-indent-align-list-continuation', when set to nil,**

will not align continuations of bracketed lists, but will indent them by the fixed width 'js-indent-level'.

## **15.36 CSS mode**

### **15.36.1 Support for completing attribute values, at-rules, bang-rules,**

HTML tags, classes and IDs using the 'completion-at-point' command. Completion candidates for HTML classes and IDs are retrieved from open HTML mode buffers.

### **15.36.2 CSS mode now binds 'C-h S' to a function that will show**

information about a CSS construct (an at-rule, property, pseudo-class, pseudo-element, with the default being guessed from context). By default the information is looked up on the Mozilla Developer Network, but this can be customized using 'css-lookup-url-format'.

### **15.36.3 CSS colors are fontified using the color they represent as the**

background. For instance, #ff0000 would be fontified with a red background.

## **15.37 Emacs now supports character name escape sequences in character and**

string literals. The syntax variants 'character name' and 'U+code' are supported.

## **15.38 Prog mode has some support for multi-mode indentation.**

This allows better indentation support in modes that support multiple programming languages in the same buffer, like literate programming environments or ANTLR programs with embedded Python code.

A major mode can provide indentation context for a sub-mode. To support this, modes should use 'prog-first-column' instead of a literal zero and avoid calling 'widen' in their indentation functions. See the node "(elisp) Mode-Specific Indent" in the ELisp manual for more details.

## **15.39 ERC**

### **15.39.1 New variable 'erc-default-port-tls' used to connect to TLS IRC**

servers.

## **15.40 URL**

### **15.40.1 The new function 'url-cookie-delete-cookie' can be used to**

programmatically delete all cookies, or cookies from a specific domain.

### **15.40.2 'url-retrieve-synchronously' now takes an optional time-out parameter.**

### **15.40.3 The URL package now supports HTTPS over proxies supporting CONNECT.**

### **15.40.4 'url-user-agent' now defaults to 'default', and the User-Agent**

string is computed dynamically based on 'url-privacy-level'.

## **15.41 VC and related modes**

### **15.41.1 'vc-dir-mode' now binds 'vc-log-outgoing' to 'O'; and has various**

branch-related commands on a keymap bound to 'B'.

### **15.41.2 'vc-region-history' is now bound to 'C-x v h', replacing the older**

'vc-insert-headers' binding.

### **15.41.3 New user option 'vc-git-print-log-follow' to follow renames in Git logs**

for a single file.



## **15.42 CC mode**

### **15.42.1 Opening a .h file will turn C or C++ mode depending on language used.**

This is done with the help of the 'c-or-c++-mode' function, which analyzes buffer contents to infer whether it's a C or C++ source file.

### **15.43 New option 'cpp-message-min-time-interval' to allow user control**

of progress messages in cpp.el.

### **15.44 New DNS mode command 'dns-mode-ipv6-to-nibbles' to convert IPv6 addresses**

to a format suitable for reverse lookup zone files.

## **15.45 Ispell**

### **15.45.1 Enchant is now supported as a spell-checker.**

Enchant is a meta-spell-checker that uses providers such as Hunspell to do the actual checking. With it, users can use spell-checkers not directly supported by Emacs, such as Voikko, Hspell and AppleSpell, more easily share personal word-lists with other programs, and configure different spelling-checkers for different languages. (Version 2.1.0 or later of Enchant is required.)

## **15.46 Flymake**

### **15.46.1 Flymake has been completely redesigned**

Flymake now annotates arbitrary buffer regions, not just lines. It supports arbitrary diagnostic types, not just errors and warnings (see variable 'flymake-diagnostic-types-alist').

It also supports multiple simultaneous backends, meaning that you can check your buffer from different perspectives (see variable 'flymake-diagnostic-functions'). Backends for Emacs Lisp mode are provided.

The old Flymake behavior is preserved in the so-called "legacy backend", which has been updated to benefit from the new UI features.

## 15.47 Term

### 15.47.1 term-char-mode 模式下的 buffer 默认为只读模式

这个 buffer 默认设置为只读模式主要防止其他除了程序过滤器之外的任何对其进行修改的行为；并且光标的移动也在有所限制，主要用为了保持每次命令执行后光标都处理“当前”位置。这也是为了在交互式命令中使得 emacs 更加方便获取其状态。

可以通过 **term-char-mode-buffer-read-only** 来控制 buffer 是否为只读，Emacs 26 以后这个值默认设置不为 nil，如果想关闭只读，设置其值为 nil 就行。同理可以通过另一个变量，即：**term-char-mode-point-at-process-mark** 来控制光标是否可上下移动，其默认值不是 nil。如果想让光标能上下移动，设置这个值为 nil。

## 15.48 Xref

### 15.48.1 When an xref buffer is needed, 'TAB' quits and jumps to an xref.

A new command 'xref-quit-and-goto-xref', bound to 'TAB' in **xref** buffers, quits the window before jumping to the destination. In many situations, the intended window configuration is restored, just as if the **xref** buffer hadn't been necessary in the first place.

## 16 New Modes and Packages in Emacs 26.1

### 16.1 New Elisp data-structure library 'radix-tree'.

### 16.2 New library 'xdg' with utilities for some XDG standards and specs.

### 16.3 HTML

#### 16.3.1 A new submode of 'html-mode', 'mhtml-mode', is now the default

mode for \*.html files. This mode handles indentation, fontification, and commenting for embedded JavaScript and CSS.

### 16.4 New mode 'conf-toml-mode' is a sub-mode of 'conf-mode', specialized

for editing TOML files.

**16.5** New mode **'conf-desktop-mode'** is a sub-mode of **'conf-unix-mode'**,

specialized for editing freedesktop.org desktop entries.

**16.6** New minor mode **'pixel-scroll-mode'** provides smooth pixel-level scrolling.

**16.7** New major mode **'less-css-mode'** (a minor variant of **'css-mode'**) for

editing Less files.

**16.8** New package **'auth-source-pass'** integrates **'auth-source'** with the

password manager password-store (<http://passwordstore.org>).

## **17 Incompatible Lisp Changes in Emacs 26.1**

**17.1** **'password-data'** is now a hash-table so that **'password-read'** can use

any object for the **'key'** argument.

**17.2** Command **'dired-mark-extension'** now automatically prepends a **'.'** to the

extension when not present. The new command **'dired-mark-suffix'** behaves similarly but it doesn't prepend a **'.'**

**17.3** Certain **cond/pcase/cl-case** forms are now compiled using a faster jump

table implementation. This uses a new bytecode op **'switch'**, which isn't compatible with previous Emacs versions. This functionality can be disabled by setting **'byte-compile-cond-use-jump-table'** to nil.

#### **17.4 If 'comment-auto-fill-only-comments' is non-nil, 'auto-fill-function'**

is now called only if either no comment syntax is defined for the current buffer or the self-insertion takes place within a comment.

#### **17.5 The alist 'ucs-names' is now a hash table.**

#### **17.6 'if-let' and 'when-let' now support binding lists as defined by the**

SRFI-2 (Scheme Request for Implementation 2).

#### **17.7 'C-up', 'C-down', 'C-left' and 'C-right' are now defined in term**

mode to send the same escape sequences that xterm does. This makes things like 'forward-word' in readline work.

#### **17.8 Customizable variable 'query-replace-from-to-separator'**

now doesn't propertize the string value of the separator. Instead, text properties are added by 'query-replace-read-from'. Additionally, the new nil value restores pre-24.5 behavior of not providing replacement pairs via the history.

#### **17.9 Some obsolete functions, variables, and faces have been removed:**

##### **17.9.1 'make-variable-frame-local'. Variables cannot be frame-local any more.**

##### **17.9.2 From subr.el: 'window-dot', 'set-window-dot', 'read-input', 'show-buffer', 'eval-current-buffer', 'string-to-int'.**

##### **17.9.3 'incomplete-prospects-length'.**

##### **17.9.4 All the default-FOO variables that hold the default value of the**

FOO variable. Use 'default-value' and 'setq-default' to access and change FOO, respectively. The exhaustive list of removed variables is: 'default-mode-line-format', 'default-header-line-format', 'default-line-spacing', 'default-abbrev-mode', 'default-ctl-arrow', 'default-truncate-lines', 'default-left-margin',

'default-tab-width', 'default-case-fold-search', 'default-left-margin-width', 'default-right-margin-width', 'default-left-fringe-width', 'default-right-fringe-width', 'default-fringes-outside-margins', 'default-scroll-bar-width', 'default-vertical-scroll-bar', 'default-indicate-empty-lines', 'default-indicate-buffer-boundaries', 'default-fringe-indicator-alist', 'default-fringe-cursor-alist', 'default-scroll-up-aggressively', 'default-scroll-down-aggressively', 'default-fill-column', 'default-cursor-type', 'default-cursor-in-non-selected-windows', 'default-buffer-file-coding-system', 'default-major-mode', and 'default-enable-multibyte-characters'.

**17.9.5 Many variables obsoleted in 22.1 referring to face symbols.**

**17.10 The variable 'text-quoting-style' is now a customizable option. It**

controls whether to and how to translate ASCII quotes in messages and help output. Its possible values and their semantics remain unchanged from Emacs 25. In particular, when this variable's value is 'grave', all quotes in formats are output as-is.

**17.11 Functions like 'check-declare-file' and 'check-declare-directory'**

now generate less chatter and more-compact diagnostics. The auxiliary function 'check-declare-errmsg' has been removed.

**17.12 The regular expression character class '[:blank:]' now matches**

Unicode horizontal whitespace as defined in the Unicode Technical Standard #18. If you only want to match space and tab, use '[ ]' instead.

**17.13 'min' and 'max' no longer round their results.**

Formerly, they returned a floating-point value if any argument was floating-point, which was sometimes numerically incorrect. For example, on a 64-bit host (max 1e16 10000000000000001) now returns its second argument instead of its first.

### **17.14 The variable 'old-style-backquotes' has been made internal and**

renamed to 'lread-old-style-backquotes'. No user code should use this variable.

### **17.15 'default-file-name-coding-system' now defaults to a coding system**

that does not process CRLF. For example, it defaults to 'utf-8-unix' instead of to 'utf-8'. Before this change, Emacs would sometimes mishandle file names containing these control characters.

### **17.16 'file-attributes', 'file-symlink-p' and 'make-symbolic-link' no**

longer quietly mutate the target of a local symbolic link, so that Emacs can access and copy them reliably regardless of their contents. The following changes are involved.

#### **17.16.1 'file-attributes' and 'file-symlink-p' no longer prepend "/" to**

symbolic links whose targets begin with "/" and contain ":". For example, if a symbolic link "x" has a target "y:z:", '(file-symlink-p "x")' now returns *"/y:z:" rather than ":/y:z:"*.

#### **17.16.2 'make-symbolic-link' no longer looks for file name handlers of**

target when creating a symbolic link. For example, '(make-symbolic-link "/y:z:" "x")' now creates a symbolic link to *"/y:z:"* instead of failing.

#### **17.16.3 'make-symbolic-link' removes the remote part of a link target if**

target and newname have the same remote part. For example, '(make-symbolic-link "/x:y:a" "/x:y:b")' creates a link with the literal string "a"; and '(make-symbolic-link "/x:y:a" "/x:z:b")' creates a link with the literal string *"/x:y:a"* instead of failing.

#### **17.16.4 'make-symbolic-link' now expands a link target with leading "~"**

only when the optional third arg is an integer, as when invoked interactively. For example, '(make-symbolic-link "~y" "x")' now creates a link with target the literal string "~y"; to get the old behavior, use '(make-symbolic-link (expand-file-name "~y") "x")'. To avoid this expansion in interactive use, you can now prefix the link target with ":". *For example, '(make-symbolic-link ":~y" "x" 1)' now creates a link to literal "~y".*

#### **17.17 'file-truename' returns a quoted file name if the target of a**

symbolic link has remote file name syntax.

#### **17.18 Module functions are now implemented slightly differently; in**

particular, the function 'internal-module-call' has been removed. Code that depends on undocumented internals of the module system might break.

#### **17.19 The argument LOCKNAME of 'write-region' is propagated to file name**

handlers now.

#### **17.20 When built against recent versions of GTK+, Emacs always uses**

gtk<sub>windowmove</sub> for moving frames and ignores the value of the variable 'x-gtk-use-window-move'. The variable is now obsolete.

#### **17.21 Several functions that create or rename files now treat their**

destination argument specially only when it is a directory name, i.e., when it ends in '/' on GNU and other POSIX-like systems. When the destination argument D of one of these functions is an existing directory and the intent is to act on an entry in that directory, D should now be a directory name. For example, (rename-file "e" "f/") renames to 'f/e'. Although this formerly happened sometimes even when D was not a directory name, as in (rename-file "e" "f") where 'f' happened to be a directory, the old behavior

often contradicted the documentation and had inherent races that led to security holes. A call like `(rename-file C D)` that used the old, undocumented behavior can be written as `(rename-file C (file-name-as-directory D))`, a formulation portable to both older and newer versions of Emacs. Affected functions include `'add-name-to-file'`, `'copy-directory'`, `'copy-file'`, `'format-write-file'`, `'gnus-copy-file'`, `'make-symbolic-link'`, `'rename-file'`, `'thumbs-rename-images'`, and `'write-file'`.

### **17.22 The list returned by `'overlays-at'` is now in decreasing priority order.**

The documentation of this function always said the order should be that of decreasing priority, if the 2nd argument of the function is non-nil, but the code returned the list in the increasing order of priority instead. Now the code does what the documentation says it should do.

### **17.23 `'format'` now avoids allocating a new string in more cases.**

`'format'` was previously documented to return a newly-allocated string, but this documentation was not correct, as `(eq x (format x))` returned t when x was the empty string. `'format'` is no longer documented to return a newly-allocated string, and the implementation now takes advantage of the doc change to avoid making copies of strings in common cases like `(format "foo")` and `(format "%s" "foo")`.

### **17.24 The function `'eldoc-message'` now accepts a single argument.**

Programs that called it with multiple arguments before should pass them through `'format'` first. Even that is discouraged: for ElDoc support, you should set `'eldoc-documentation-function'` instead of calling `'eldoc-message'` directly.

### **17.25 Using `'&rest'` or `'&optional'` incorrectly is now an error.**

For example giving `'&optional'` without a following variable, or passing `'&optional'` multiple times:

```
(defun foo (&optional &rest x)) (defun bar (&optional &optional x))
```



Previously, Emacs would just ignore the extra keyword, or give incorrect results in certain cases.

### **17.26 The pinentry.el library has been removed.**

That package (and the corresponding change in GnuPG and pinentry) was intended to provide a way to input passphrase through Emacs with GnuPG 2.0. However, the change to support that was only implemented in GnuPG  $\geq 2.1$  and didn't get backported to GnuPG 2.0. And with GnuPG 2.1 and later, pinentry.el is not needed at all. So the library was useless, and we removed it. GnuPG 2.0 is no longer supported by the upstream project.

To adapt to the change, you may need to set 'epa-pinentry-mode' to the symbol 'loopback'. Alternatively, leave 'epa-pinentry-mode' at its default value of nil, and remove the 'allow-emacs-pinentry' setting from your 'gpg-agent.conf' configuration file, usually found in the '~/.gnupg' directory.

Note that previously, it was said that passphrase input through minibuffer would be much less secure than other graphical pinentry programs. However, these days the difference is insignificant: the 'read-password' function sufficiently protects input from leakage to message logs. Emacs still doesn't use secure memory to protect passphrases, but it was also removed from other pinentry programs as the attack is unrealistic on modern computer systems which don't utilize swap memory usually.

## **18 Lisp Changes in Emacs 26.1**

### **18.1 The function 'assoc' now takes an optional third argument TESTFN.**

This argument, when non-nil, is used for comparison instead of 'equal'.

### **18.2 New optional argument TESTFN in 'alist-get', 'map-elt' and 'map-put'.**

If non-nil, the argument specifies a function to use for comparison, instead of, respectively, 'assq' and 'eql'.

### **18.3 New function 'seq-set-equal-p' to check if SEQUENCE1 and SEQUENCE2**

contain the same elements, regardless of the order.

#### **18.4 The new function 'mapbacktrace' applies a function to all frames of**

the current stack trace.

#### **18.5 The new function 'file-name-case-insensitive-p' tests whether a**

given file is on a case-insensitive filesystem.

#### **18.6 Several accessors for the value returned by 'file-attributes'**

have been added. They are: 'file-attribute-type', 'file-attribute-link-number', 'file-attribute-user-id', 'file-attribute-group-id', 'file-attribute-access-time', 'file-attribute-modification-time', 'file-attribute-status-change-time', 'file-attribute-size', 'file-attribute-modes', 'file-attribute-inode-number', 'file-attribute-device-number' and 'file-attribute-collect'.

#### **18.7 The new function 'buffer-hash' computes a fast, non-consing hash of**

a buffer's contents.

#### **18.8 'interrupt-process' now consults the list 'interrupt-process-functions',**

to determine which function has to be called in order to deliver the SIGINT signal. This allows Tramp to send the SIGINT signal to remote asynchronous processes. The hitherto existing implementation has been moved to 'internal-default-interrupt-process'.

#### **18.9 The new function 'read-multiple-choice' prompts for multiple-choice**

questions, with a handy way to display help texts.

#### **18.10 'comment-indent-function' values may now return a cons to specify a**

range of indentation.

**18.11 New optional argument TEXT in 'make-temp-file'.**

**18.12 New function 'define-symbol-prop'.**

**18.13 New function 'secure-hash-algorithms' to list the algorithms that**

'secure-hash' supports. See the node "(elisp) Checksum/Hash" in the ELisp manual for details.

**18.14 Emacs now exposes the GnuTLS cryptographic API with the functions**

'gnutls-macs' and 'gnutls-hash-mac'; 'gnutls-digests' and 'gnutls-hash-digest'; 'gnutls-ciphers' and 'gnutls-symmetric-encrypt' and 'gnutls-symmetric-decrypt'. See the node "(elisp) GnuTLS Cryptography" in the ELisp manual for details.

**18.15 The function 'gnutls-available-p' now returns a list of capabilities**

supported by the GnuTLS library used by Emacs.

**18.16 Emacs now supports records for user-defined types, via the new**

functions 'make-record', 'record', and 'recordp'. Records are now used internally to represent cl-defstruct and defclass instances, for example.

If your program defines new record types, you should use package-naming conventions for naming those types. This is so any potential conflicts with other types are avoided.

**18.17 'save-some-buffers' now uses 'save-some-buffers-default-predicate'**

to decide which buffers to ask about, if the PRED argument is nil. The default value of 'save-some-buffers-default-predicate' is nil, which means ask about all file-visiting buffers.

**18.18** `string-(to|as|make)-(uni|multi)byte` are now declared obsolete.

**18.19** New variable `'while-no-input-ignore-events'` which allow

setting which special events `'while-no-input'` should ignore. It is a list of symbols.

**18.20** New function `'undo-amalgamate-change-group'` to get rid of

undo-boundaries between two states.

**18.21** New var `'definition-prefixes'` is a hash table mapping prefixes to

the files where corresponding definitions can be found. This can be used to fetch definitions that are not yet loaded, for example for `'C-h f'`.

**18.22** New var `'syntax-ppss-table'` to control the syntax-table used in

`'syntax-ppss'`.

**18.23** `'define-derived-mode'` can now specify an `:after-hook` form, which

gets evaluated after the new mode's hook has run. This can be used to incorporate configuration changes made in the mode hook into the mode's setup.

**18.24** Autoload files are now generated without timestamps.

Set `'autoload-timestamps'` to a non-nil value to get timestamps in autoload files.

**18.25** `'gnutls-boot'` now takes a parameter `':complete-negotiation'` that

says that negotiation should complete even on non-blocking sockets.

**18.26 There is now a new variable 'flyspell-sort-corrections-function'**

that allows changing the way corrections are sorted.

**18.27 The new command 'fortune-message' has been added, which displays**

fortunes in the echo area.

**18.28 New function 'func-arity' returns information about the argument list**

of an arbitrary function. This generalizes 'subr-arity' for functions that are not built-in primitives. We recommend using this new function instead of 'subr-arity'.

**18.29 New function 'region-bounds' can be used in the interactive spec**

to provide region boundaries (for rectangular regions more than one) to an interactively callable function as a single argument instead of two separate arguments 'region-beginning' and 'region-end'.

**18.30 'parse-partial-sexp' state has a new element. Element 10 is**

non-nil when the last character scanned might be the first character of a two character construct, i.e., a comment delimiter or escaped character. Its value is the syntax of that last character.

**18.31 'parse-partial-sexp's state, element 9, has now been confirmed as**

permanent and documented, and may be used by Lisp programs. Its value is a list of currently open parenthesis positions, starting with the outermost parenthesis.

**18.32 'read-color' will now display the color names using the color itself**

as the background color.

### **18.33 The function 'redirect-debugging-output' now works on platforms**

other than GNU/Linux.

### **18.34 The new function 'string-version-lessp' compares strings by**

interpreting consecutive runs of numerical characters as numbers, and compares their numerical values. According to this predicate, "foo2.png" is smaller than "foo12.png".

### **18.35 Numeric comparisons and 'logb' no longer return incorrect answers**

due to internal rounding errors. For example, '(< most-positive-fixnum (+ 1.0 most-positive-fixnum))' now correctly returns t on 64-bit hosts.

### **18.36 The functions 'ffloor', 'fceil', 'ftruncate' and 'fround' now**

accept only floating-point arguments, as per their documentation. Formerly, they quietly accepted integer arguments and sometimes returned nonsensical answers, e.g., '(< N (ffloor N))' could return t.

### **18.37 On hosts like GNU/Linux x86-64 where a 'long double' fraction**

contains at least `EMACS_INTWIDTH - 3` bits, 'format' no longer returns incorrect answers due to internal rounding errors when formatting Emacs integers with '%e', '%f', or '%g' conversions. For example, on these hosts '(eql N (string-to-number (format "%.0f" N)))' now returns t for all Emacs integers N.

### **18.38 Calls that accept floating-point integers (for use on hosts with**

limited integer range) now signal an error if arguments are not integral. For example '(decode-char 'ascii 0.5)' now signals an error.

**18.39 Functions 'string-trim-left', 'string-trim-right' and 'string-trim'**

now accept optional arguments which specify the regexp of a substring to trim.

**18.40 The new function 'char-from-name' converts a Unicode name string**

to the corresponding character code.

**18.41 New functions 'sxhash-eq' and 'sxhash-eql' return hash codes of a**

Lisp object suitable for use with 'eq' and 'eql' correspondingly. If two objects are 'eq' ('eql'), then the result of 'sxhash-eq' ('sxhash-eql') on them will be the same.

**18.42 Function 'sxhash' has been renamed to 'sxhash-equal' for**

consistency with the new functions. For compatibility, 'sxhash' remains as an alias to 'sxhash-equal'.

**18.43 'make-hash-table' now defaults to a rehash threshold of 0.8125**

instead of 0.8, to avoid rounding glitches.

**18.44 New function 'add-variable-watcher' can be used to call a function**

when a symbol's value is changed. This is used to implement the new debugger command 'debug-on-variable-change'.

**18.45 New variable 'print-escape-control-characters' causes 'prin1' and**

'print' to output control characters as backslash sequences.

**18.46 Time conversion functions that accept a time zone rule argument now**

allow it to be OFFSET or a list (OFFSET ABBR), where the integer OFFSET is a count of seconds east of Universal Time, and the string ABBR is a time zone abbreviation. The affected functions are 'current-time-string', 'current-time-zone', 'decode-time', 'format-time-string', and 'set-time-zone-rule'.

**18.47 'format-time-string' now formats '%q' to the calendar quarter.**

**18.48 New built-in function 'mapcan'.**

It avoids unnecessary consing (and garbage collection).

**18.49 'car' and 'cdr' compositions 'cXXXr' and 'cXXXXr' are now part of Elisp.**

**18.50 'gensym' is now part of Elisp.**

**18.51 Low-level list functions like 'length' and 'member' now do a better**

job of signaling list cycles instead of looping indefinitely.

**18.52 The new functions 'make-nearby-temp-file' and 'temporary-file-directory'**

can be used for creation of temporary files on remote or mounted directories.

**18.53 On GNU platforms when operating on a local file, 'file-attributes'**

no longer suffers from a race when called while another process is altering the filesystem. On non-GNU platforms 'file-attributes' attempts to detect the race, and returns nil if it does so.

**18.54 The new function 'file-local-name' can be used to specify arguments**

of remote processes.



**18.55 The new functions 'file-name-quote', 'file-name-unquote' and**

'file-name-quoted-p' can be used to quote / unquote file names with the prefix `"/:"`.

**18.56 The new error 'file-missing', a subcategory of 'file-error', is now**

signaled instead of 'file-error' if a file operation acts on a file that does not exist.

**18.57 The function 'delete-directory' no longer signals an error when**

operating recursively and when some other process deletes the directory or its files before 'delete-directory' gets to them.

**18.58 New error type 'user-search-failed' like 'search-failed' but**

avoids debugger like 'user-error'.

**18.59 The function 'line-number-at-pos' now takes a second optional**

argument 'absolute'. If this parameter is nil, the default, this function keeps on returning the line number taking potential narrowing into account. If this parameter is non-nil, the function ignores narrowing and returns the absolute line number.

**18.60 The function 'color-distance' now takes a second optional argument**

'metric'. When non-nil, it should be a function of two arguments that accepts two colors and returns a number.

**18.61 Changes in Frame and Window Handling**

**18.61.1 Resizing a frame no longer runs 'window-configuration-change-hook'.**

'window-size-change-functions' should be used instead.

**18.61.2 The new function 'frame-size-changed-p' can tell whether a frame has**

been resized since the last time 'window-size-change-functions' has been run.

**18.61.3 The function 'frame-geometry' now also returns the width of a**

frame's outer border.

**18.61.4 New frame parameters and changed semantics for older ones:**

1. 'z-group' positions a frame above or below all others.
2. 'min-width' and 'min-height' specify the absolute minimum size of a frame.
3. 'parent-frame' makes a frame the child frame of another Emacs frame. The section "(elisp) Child Frames" in the ELisp manual describes the intrinsics of that relationship.
4. 'delete-before' triggers deletion of one frame before that of another.
5. 'mouse-wheel-frame' specifies another frame whose windows shall be scrolled instead.
6. 'no-other-frame' has 'next-frame' and 'previous-frame' skip this frame.
7. 'skip-taskbar' removes a frame's icon from the taskbar and has 'Alt-**<TAB>**' skip this frame.
8. 'no-focus-on-map' avoids that a frame gets input focus when mapped.
9. 'no-accept-focus' means that a frame does not want to get input focus via the mouse.
10. 'undecorated' removes the window manager decorations from a frame.
11. 'override-redirect' tells the window manager to disregard this frame.
12. 'width' and 'height' now allow the specification of pixel values and ratios.

13. 'left' and 'top' now allow the specification of ratios.
14. 'keep-ratio' preserves size and position of child frames when their parent frame is resized.
15. 'no-special-glyphs' suppresses display of truncation and continuation glyphs in a frame.
16. 'auto-hide-function' and 'minibuffer-exit' handle auto hiding of frames and exiting from minibuffer individually.
17. 'fit-frame-to-buffer-margins' and 'fit-frame-to-buffer-sizes' handle fitting a frame to its buffer individually.
18. 'drag-internal-border', 'drag-with-header-line', 'drag-with-mode-line', 'snap-width', 'top-visible' and 'bottom-visible' allow dragging and resizing frames with the mouse.
19. 'minibuffer' is now set to the default minibuffer window when initially specified as nil and is not reset to nil when initially specifying a minibuffer window.

**18.61.5 The new function 'frame-list-z-order' returns a list of all frames**

in Z (stacking) order.

**18.61.6 The function 'x-focus-frame' optionally tries to not activate its**

frame.

**18.61.7 The variable 'focus-follows-mouse' has a third meaningful value**

'auto-raise' to indicate that the window manager automatically raises a frame when the mouse pointer enters it.

**18.61.8 The new function 'frame-restack' puts a frame above or below**

another on the display.

**18.61.9 The new face 'internal-border' specifies the background of a frame's**

internal border.

**18.61.10 The NORECORD argument of 'select-window' now has a meaningful value**

'mark-for-redisplay' which is like any other non-nil value but marks WINDOW for redisplay.

**18.61.11 Support for side windows is now official. The display action**

function 'display-buffer-in-side-window' will display its buffer in a side window. Functions for toggling all side windows on a frame, changing and reversing the layout of side windows and returning the main (major non-side) window of a frame are provided. For details consult the section "(elisp) Side Windows" in the ELisp manual.

**18.61.12 Support for atomic windows - rectangular compositions of windows**

treated by 'split-window', 'delete-window' and 'delete-other-windows' like a single live window - is now official. For details consult the section "(elisp) Atomic Windows" in the ELisp manual.

**18.61.13 New 'display-buffer' alist entry 'window-parameters' allows the**

assignment of window parameters to the window used for displaying the buffer.

**18.61.14 New function 'display-buffer-reuse-mode-window' is an action function**

suitable for use in 'display-buffer-alist'. For example, to avoid creating a new window when opening man pages when there's already one, use

```
(add-to-list 'display-buffer-alist '("\\Man .*\\") . (display-buffer-reuse-mode-window (inhibit-same-window . nil) (mode . Man-mode))))
```

**18.61.15 New window parameter 'no-delete-other-windows' prevents that**

its window gets deleted by 'delete-other-windows'.

**18.61.16 New window parameters 'mode-line-format' and 'header-line-format'**

allow the buffer-local formats for this window to be overridden.

**18.61.17 New command 'window-swap-states' swaps the states of two live**

windows.

**18.61.18 New functions 'window-pixel-width-before-size-change' and**

'window-pixel-height-before-size-change' support detecting which window changed size when 'window-size-change-functions' are run.

**18.61.19 The new function 'window-lines-pixel-dimensions' returns the pixel**

dimensions of a window's text lines.

**18.61.20 The new function 'window-largest-empty-rectangle' returns the**

dimensions of the largest rectangular area not occupying any text in a window's body.

**18.61.21 The semantics of 'mouse-autoselect-window' has changed slightly.**

For details see the section "(elisp) Mouse Window Auto-selection" in the ELisp manual.

**18.61.22 'select-frame-by-name' now may return a frame on another display**

if it does not find a suitable one on the current display.

**18.62 'tcl-auto-fill-mode' is now declared obsolete. Its functionality**

can be replicated simply by setting 'comment-auto-fill-only-comments'.

**18.63 New pcase pattern 'rx' to match against an rx-style regular expression.**

For details, see the doc string of 'rx-pcase-macroexpander'.

**18.64 New functions to set region from secondary selection and vice versa.**

The new functions 'secondary-selection-to-region' and 'secondary-selection-from-region' let you set the beginning and the end of the region from those of the secondary selection and vice versa.

**18.65 New function 'lgstring-remove-glyph' can be used to modify a**

gstring returned by the underlying layout engine (e.g. m17n-flt, uniscribe).

## **19 Changes in Emacs 26.1 on Non-Free Operating Systems**

**19.1 Intercepting hotkeys on Windows 7 and later now works better.**

The new keyboard hooking code properly grabs system hotkeys such as 'Win-\*' and 'Alt-TAB', in a way that Emacs can get at them before the system. This makes the 'w32-register-hot-key' functionality work again on all versions of MS-Windows starting with Windows 7. On Windows NT and later you can now register any hotkey combination. (On Windows 9X, the previous limitations, spelled out in the Emacs manual, still apply.)

**19.2 'convert-standard-filename' no longer mirrors slashes on MS-Windows.**

Previously, on MS-Windows this function converted slash characters in file names into backslashes. It no longer does that. If your Lisp program used

'convert-standard-filename' to prepare file names to be passed to subprocesses (which is not the recommended usage of that function), you will now have to mirror slashes in your application code. One possible way is this:

```
(let ((start 0)) (while (string-match "/" file-name start) (aset file-name
(match-beginning 0) ?\ (setq start (match-end 0)))))
```

### **19.3 GUI sessions on MS-Windows now treat SIGINT like Posix platforms do.**

The effect of delivering a Ctrl-C (SIGINT) signal to a GUI Emacs on MS-Windows is now the same as on Posix platforms – Emacs saves the session and exits. In particular, this will happen if you start emacs.exe from the Windows shell, then type Ctrl-C into that shell's window.

### **19.4 'signal-process' supports SIGTRAP on Windows XP and later.**

The 'kill' emulation on Windows now maps SIGTRAP to a call to the 'DebugBreakProcess' API. This causes the receiving process to break execution and return control to the debugger. If no debugger is attached to the receiving process, the call is typically ignored. This is in contrast to the default action on POSIX Systems, where it causes the receiving process to terminate with a core dump if no debugger has been attached to it.

### **19.5 'set-mouse-position' and 'set-mouse-absolute-pixel-position' work**

on macOS.

### **19.6 Emacs can now be run as a GUI application from the command line on**

macOS.

### **19.7 'ns-appearance' and 'ns-transparent-titlebar' change the appearance**

of frame decorations on macOS 10.9+.

**19.8 'ns-use-thin-smoothing' enables thin font smoothing on macOS 10.8+.**

**19.9 'process-attributes' on Darwin systems now returns more information.**

**19.10 Mousewheel and trackpad scrolling on macOS 10.7+ now behaves more**

like the macOS default. The new variables 'ns-mwheel-line-height', 'ns-use-mwheel-acceleration' and 'ns-use-mwheel-momentum' can be used to customize the behavior.

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