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# libgdtl documentation

*Release latest*

Nov 04, 2019



## GENERAL

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## LIBGDTL INTRODUCTION

BiDi, shaping and basic text layout for Godot Engine.

### 1.1 Dependencies

- Godot 3.1+
- C++14 compiler
- Meson build system (for gdnative module build only)
- SCons build system

### 1.2 Compiling (as builtin module)

#### 1.2.1 Build options

Name	Description	Default value
<code>builtin_runtime</code>	Use the built-in libraries	true
<code>use_graphite2</code>	Enable SIL Graphite 2 complementary shaper	true
<code>use_font_wrapper</code>	Enable Godot font wrapper for default controls	false

If `use_font_wrapper` is enabled, apply `patch_font.diff` from the root of this repository to the Godot engine source first.

#### 1.2.2 Building *libdgtl* module

Clone this repository (without `-recursive` flag) into Godot's `modules` subfolder as `godot_tl`. Rebuild Godot engine as usual.

### 1.3 Compiling (as gdnative module)

#### 1.3.1 Build options

Name	Description	Default value
<code>godot-cpp-lib-name</code>	godot-cpp static library name (without <code>.a</code> or <code>.lib</code> extension)	<code>libgodot-cpp</code>
<code>static-runtime</code>	Link libraries statically for better portability	false
<code>builtin-runtime</code>	Use the built-in libraries	false
<code>use-graphite2</code>	Enable SIL Graphite 2 complementary shaper	true

### 1.3.2 Building *godot-cpp* static library

See <https://github.com/GodotNativeTools/godot-cpp/blob/master/README.md#compiling-the-cpp-bindings-library>

### 1.3.3 Building *libgdtl* module

You can compile this module by executing:

```
meson {Targer-Folder} -Dgodot-cpp-lib-name={Godot-CPP-Name} --buildtype=release
ninja -C {Targer-Folder}
```

## 1.4 License

- The source code of the **libgdtl** module is released under unlicense.  
For more information, see <http://unlicense.org/> or the accompanying UNLICENSE file.
- **Godot** and **GodotNativeTools** are licensed under MIT license.  
For more information, see <https://github.com/godotengine/godot/blob/master/LICENSE.txt>.
- **HarfBuzz** is licensed under MIT-like License.  
For more information, see <https://github.com/harfbuzz/harfbuzz/blob/master/COPYING>
- **ICU4C** is licensed under Unicode, Inc. License.  
For more information, see <http://www.unicode.org/copyright.html#License>
- **FreeType** is licensed under FreeType License (BSD-like) or GNU General Public License (GPL), version 2.  
For more information, see <https://www.freetype.org/license.html>
- **SIL Graphite engine** is licensed under GNU Lesser General Public License (LGPL), version 2.1+ or GNU General Public License (GPL), version 2 or Mozilla Public License.  
For more information, see <https://github.com/silnrsi/graphite/blob/master/COPYING>

## 1.5 Demo data

**Montserrat** (<https://github.com/JuliettaUla/Montserrat/>), **Awami Nastaliq** (<https://software.sil.org/awami/download/>), **Comic Neue** (<http://comicneue.com/>) and **Noto** (<https://www.google.com/get/noto/>) fonts are published under the **SIL Open Font License, Version 1.1** ([https://scripts.sil.org/cms/scripts/page.php?site\\_id=nrsi&id=OFL](https://scripts.sil.org/cms/scripts/page.php?site_id=nrsi&id=OFL))

**Material Design icons by Google** (<https://github.com/google/material-design-icons>) are published under the **Apache License Version 2.0** (<https://www.apache.org/licenses/LICENSE-2.0.txt>)

**Noto Color Emoji** font is cut down to single glyph (U+1F604) using **glyphhanger** (<https://github.com/filamentgroup/glyphhanger>).

## INSTALLATION

### 2.1 Module

Use Godot editor and export templates compiled with the module.

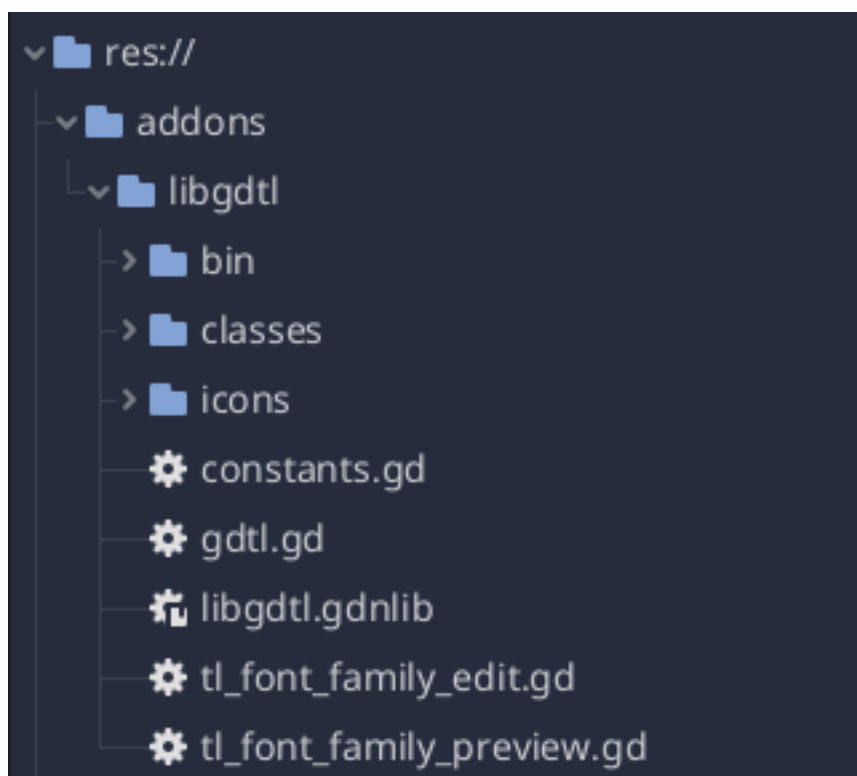
Module is ready to use, no modification to the project is required.

### 2.2 GDNative

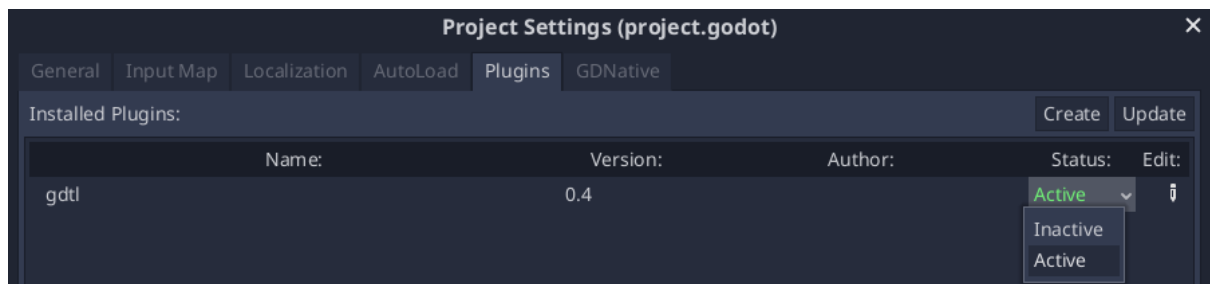
GDNative plugin is intended to be used with official Godot editor and export templates.

To install plugin:

1. Create *addons* folder in the root of your project.
2. Copy the contents of archive to the *addons* folder. (Do not drag-and-drop it into *FileSystem* tab of the editor. Right-click *addons* folder, select *Open in File Manager* and use your OS file manager to copy/extract files.)
3. After installing plugin, your file system should look like this:



4. Go to *Project Settings*, click on the *Plugins* tab and activate *gdtl* plugin.





## FONT SUBSTITUTION

Font substitution is used to find a replacement for an unavailable character.

In addition to main list of the substitution fonts, you can specify preferred fonts for the script (writing system) and language.

Use [ISO 639-1](https://en.wikipedia.org/wiki/ISO_639-1) ([https://en.wikipedia.org/wiki/ISO\\_639-1](https://en.wikipedia.org/wiki/ISO_639-1)) codes for the language names, and [ISO 15924](https://en.wikipedia.org/wiki/ISO_15924) ([https://en.wikipedia.org/wiki/ISO\\_15924](https://en.wikipedia.org/wiki/ISO_15924)) for the script names.

Substitution lists have following priority: *Language, Script, Main List*. Providing script and language information is not required, module will try to detect script (but not the language) automatically, but detection is not always successful and correct. Manual config can improve shaping speed if large number of fonts used.

The screenshot shows the 'Script Variables' panel in the libgdtl application. The panel has a dark theme and includes a search bar at the top. Below the search bar, there is a section for 'Script Variables' with a 'Style name' field and an 'Add style' button. A 'Bold' style is selected, and a font preview is shown with the text 'Etaoin shrdlu' in a bold, monospace font. Below the preview, there is a 'Main font list' with a dropdown menu showing '0' and '[empty]'. Below this, there are sections for 'Script' and 'Lang'. The 'Script' section has a dropdown menu showing '0' and '[empty]', and a 'Remove "Arab" script' button. The 'Lang' section has a dropdown menu showing '0' and '[empty]', and a 'Remove "ur" language' button. There are also buttons for 'Add script' and 'Add language'. The interface is annotated with red boxes and labels: 'Font preview' points to the 'Etaoin shrdlu' text; 'Main font list' points to the '0' dropdown; 'Font lists for specific script' points to the 'Arab' script section; and 'Font lists for specific language' points to the 'ur' language section.

Resource

Filter properties

Script Variables

Style name Add style

▼ Bold

Font preview

Etaoin shrdlu

0 [empty] ▼ Main font list

▼ Script

▼ Arab

0 [empty] ▼

Remove "Arab" script

Font lists for specific script

▼ Latn

0 [empty] ▼

Remove "Latn" script

ISO script code Add script

▼ Lang

▼ Ur

0 [empty] ▼

Remove "ur" language

Font lists for specific language

▼ En

0 [empty] ▼

Remove "en" language

ISO language code Add language

Remove "bold" style

## RICH TEXT TYPESETTING

### 4.1 Setting formatting for the range of text

1. Select desired attribute and its value in the attribute editor.
2. Enter start and end offsets of the range.
3. Click “Add” button to apply formatting.

Node: This is equivalent of the *add\_attribute* function call.

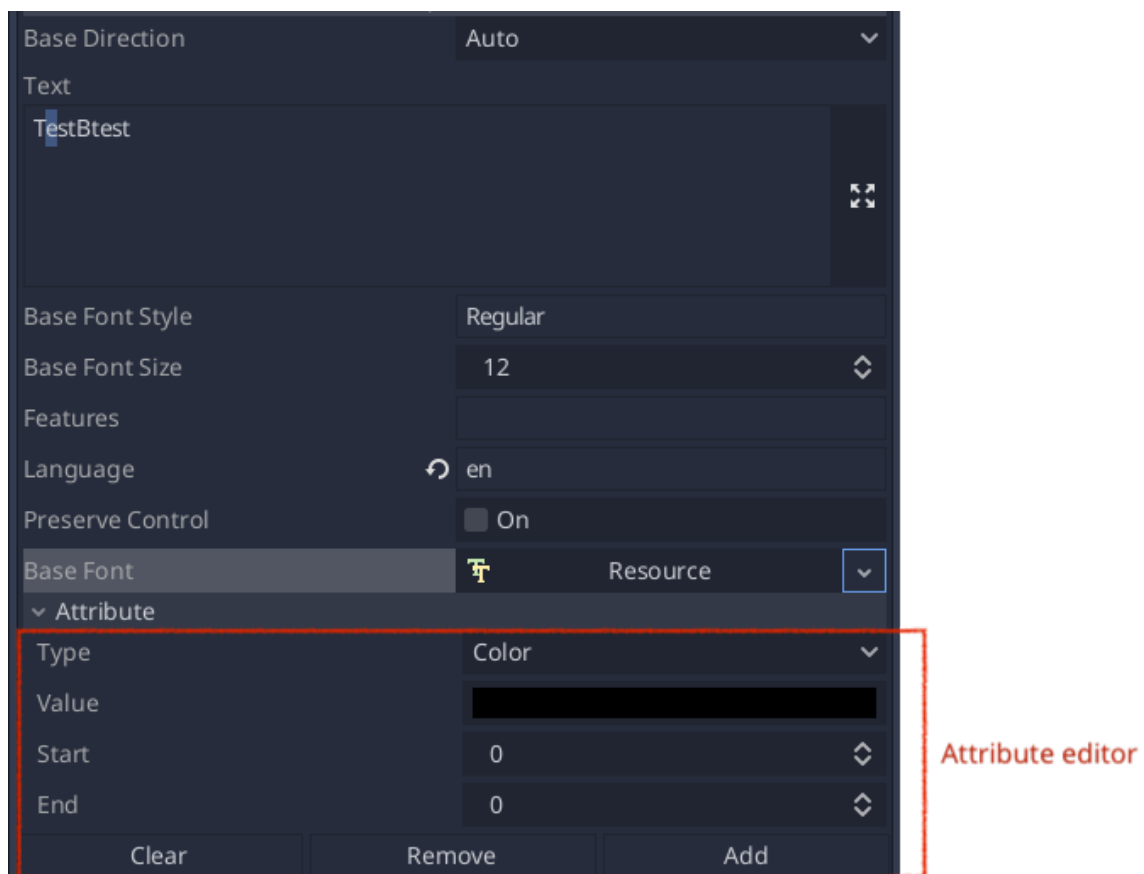
### 4.2 Removing formatting

1. Enter start and end offsets of the range in the attribute editor.
2. Click “Remove” button to clean all attributes from the range or click “Clean” to remove attributes from entire text.

Node: This is equivalent of the *remove\_attributes/clear\_attributes* function call.

### 4.3 Embedding child control into the text flow

1. Add control as child of the *TLRichTextEdit*.
2. Apply “Replacement Rect” attribute with desired size of the control to the single character of the text.
3. Apply “Replacement ID” attribute with the control name to the same character.
4. Use “Replacement VAlign” attribute to set inline alignment of the control.



## LIBGDTL API

### 5.1 TLBitmapFontFace

**Inherits:** *TLFontFace*

**Category:** Core

#### 5.1.1 Brief Description

An AngelCode Bitmap Font Generator bitmap font for drawing text.

#### 5.1.2 Properties

int	texture_flags	<b>O:</b> 2048
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#### 5.1.3 Description

TLBitmapFontFace have limited shaping support.

TLBitmapFontFace doesn't support OpenType features.

### 5.2 TLDynamicFontFace

**Inherits:** *TLFontFace*

**Category:** Core

#### 5.2.1 Brief Description

A TrueType, OpenType or Graphite font for drawing text.

#### 5.2.2 Properties

bool	<i>force_autohinter</i>	false
int	<i>hinting</i>	2
float	<i>oversampling</i>	1.0
int	texture_flags	<b>O:</b> 2048

### 5.2.3 Methods

bool	<i>has_graphite</i> ( ) const
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### 5.2.4 Enumerations

enum **DynamicFaceHinting**:

- **DF\_HINTING\_NONE = 0** — Disable font hinting (smoother but less crisp)
- **DF\_HINTING\_LIGHT = 1** — Use the light font hinting mode
- **DF\_HINTING\_NORMAL = 2** — Use the default font hinting mode (crisper but less smooth)

### 5.2.5 Property Descriptions

- bool **force\_autohinter**

<i>Default</i>	false
<i>Setter</i>	set_force_autohinter(value)
<i>Getter</i>	get_force_autohinter()

If `true`, prefers FreeType auto-hinter over the font's native hinter.

---

- int **hinting**

<i>Default</i>	2
<i>Setter</i>	set_hinting(value)
<i>Getter</i>	get_hinting()

The font hinting mode used by FreeType auto-hinter.

---

- float **oversampling**

<i>Default</i>	1.0
<i>Setter</i>	set_oversampling(value)
<i>Getter</i>	get_oversampling()

Font oversampling factor.

---

### 5.2.6 Method Descriptions

- bool **has\_graphite** ( ) const

Returns `true` if module is built with SIL Graphite 2 shaper support.

## 5.3 TLFontFace

**Inherits:**

**Inherited By:** *TLBitmapFontFace*, *TLDynamicFontFace*

**Category:** Core

### 5.3.1 Brief Description

\*Virtual class\*

A base font face class.

### 5.3.2 Properties

String	<i>font_path</i>	""
int	<i>texture_flags</i>	0

### 5.3.3 Methods

void	<i>draw_glyph</i> ( RID canvas_item, Vector2 pos, int codepoint, Color modulate, int size ) const
void	<i>draw_glyph_outline</i> ( RID canvas_item, Vector2 pos, int codepoint, Color modulate, int size ) const
float	<i>get_ascent</i> ( int size ) const
int	<i>get_base_size</i> ( ) const
float	<i>get_descent</i> ( int size ) const
Array	<i>get_glyph_outline</i> ( Vector2 pos, int codepoint, int size ) const
float	<i>get_height</i> ( int size ) const
bool	<i>load</i> ( String resource_path )
Array	<i>unicode_scripts_supported</i> ( ) const

### 5.3.4 Property Descriptions

- String **font\_path**

<i>Default</i>	""
<i>Setter</i>	set_font_path(value)
<i>Getter</i>	get_font_path()

Path of the font file.

- int **texture\_flags**

<i>Default</i>	0
<i>Setter</i>	set_texture_flags(value)
<i>Getter</i>	get_texture_flags()

Underlying textures flags, see Texture class documentation [https://docs.godotengine.org/en/latest/classes/class\\_texture.html#enumerations](https://docs.godotengine.org/en/latest/classes/class_texture.html#enumerations) for more info.

### 5.3.5 Method Descriptions

- void **draw\_glyph** ( RID canvas\_item, Vector2 pos, int codepoint, Color modulate, int size ) const

Draws a single glyph.

---

- void **draw\_glyph\_outline** ( RID canvas\_item, Vector2 pos, int codepoint, Color modulate, int size ) const

Draws single glyph outline.

---

- float **get\_ascent** ( int size ) const

Returns ascent (distance from the baseline to the highest position characters extend to) of the font.

---

- int **get\_base\_size** ( ) const

Returns default font size for bitmap fonts or 0 for dynamic fonts.

---

- float **get\_descent** ( int size ) const

Returns descent (distance from the base line to the lowest point characters extend to) of the font.

---

- Array **get\_glyph\_outline** ( Vector2 pos, int codepoint, int size ) const

Returns array of glyph counture points, if it's supported by font implementation or empty array otherwise.

---

- float **get\_height** ( int size ) const

Returns height (vertical distance between two consecutive baselines) of the font.

---

- bool **load** ( String resource\_path )

Loads font from speified file.

---

- Array **unicode\_scripts\_supported** ( ) const

Returns array of supported ISO 15924 script codes.

---

## 5.4 TLFonFamily

**Inherits:**

**Category:** Core

### 5.4.1 Brief Description

A set of fonts that make up a font family.

### 5.4.2 Properties

<i>TLFontFace</i>	<i>{style_name}/{index}</i>
<i>TLFontFace</i>	<i>{style_name}/script/{tag}/{index}</i>
<i>TLFontFace</i>	<i>{style_name}/script/{lang}/{index}</i>



### 5.4.3 Methods

void	<i>add_face</i> ( String style, <i>TLFontFace</i> ref )
void	<i>add_face_for_language</i> ( String style, <i>TLFontFace</i> ref, String lang )
void	<i>add_face_for_script</i> ( String style, <i>TLFontFace</i> ref, String script )
void	<i>add_face_unlinked</i> ( String style, <i>TLFontFace</i> ref )
void	<i>add_language</i> ( String style, String language )
void	<i>add_script</i> ( String style, String script )
void	<i>add_style</i> ( String style )
<i>TLFontIterator</i>	<i>get_face</i> ( String style ) const
<i>TLFontIterator</i>	<i>get_face_for_language</i> ( String style, String lang ) const
<i>TLFontIterator</i>	<i>get_face_for_script</i> ( String style, String script ) const
bool	<i>has_style</i> ( String style ) const
void	<i>remove_language</i> ( String style, String language )
void	<i>remove_script</i> ( String style, String script )
void	<i>remove_style</i> ( String style )

### 5.4.4 Property Descriptions

- *TLFontFace* {style\_name}/{index}

Font faces not linked to the language or script.

- *TLFontFace* {style\_name}/script/{tag}/{index}

Font faces linked to the script.

- *TLFontFace* {style\_name}/script/{lang}/{index}

Font faces linked to the language.

### 5.4.5 Method Descriptions

- void **add\_face** ( String style, *TLFontFace* ref )

Adds font face to be used for specific style. Supported scripts are detected automatically.

- void **add\_face\_for\_language** ( String style, *TLFontFace* ref, String lang )

Adds font face to be used for specific language and style.

- void **add\_face\_for\_script** ( String style, *TLFontFace* ref, String script )

Adds font face to be used for specific script and style.

- void **add\_face\_unlinked** ( String style, *TLFontFace* ref )

Adds font face to be used for specific style, without associating it with the script or language.

- void **add\_language** ( String style, String language )

Creates new font fallback list for the language, list is created automatically when `add_face` or `add_face_for_language` function is called.

Use ISO 639-1 ([https://en.wikipedia.org/wiki/ISO\\_639-1](https://en.wikipedia.org/wiki/ISO_639-1)) codes for the language names.

---

- void **add\_script** ( String style, String script )

Creates new font fallback list for the script, list is created automatically when `add_face` or `add_face_for_script` function is called.

Use ISO 15924 ([https://en.wikipedia.org/wiki/ISO\\_15924](https://en.wikipedia.org/wiki/ISO_15924)) for the script names.

---

- void **add\_style** ( String style )

Adds new style to the family, style is created automatically when any of the `add_face` functions is called.

---

- *TLFontIterator* **get\_face** ( String style ) const

Returns font iterator for the specific style.

---

- *TLFontIterator* **get\_face\_for\_language** ( String style, String lang ) const

Returns font iterator for the specific style and supported language.

---

- *TLFontIterator* **get\_face\_for\_script** ( String style, String script ) const

Returns font iterator for the specific style and supported script.

---

- bool **has\_style** ( String style ) const

Returns `true` if font family has style.

---

- void **remove\_language** ( String style, String language )

Removes font fallback list for the language.

---

- void **remove\_script** ( String style, String script )

Removes font fallback list for the script.

---

- void **remove\_style** ( String style )

Removes style from the font family.

## 5.5 TLFontIterator

**Inherits:**

**Category:** Core

### 5.5.1 Brief Description

### 5.5.2 Methods

bool	<i>is_linked</i> ( ) const
bool	<i>is_valid</i> ( ) const
bool	<i>next</i> ( )
<i>TLFontFace</i>	<i>value</i> ( ) const

### 5.5.3 Method Descriptions

- bool **is\_linked** ( ) const

Return `true` if current iterator value is part of language/script specific fallback list.

- bool **is\_valid** ( ) const

Return `true` if current iterator value is valid.

- bool **next** ( )

Advances iterator. Return `true` if current iterator value is valid.

- *TLFontFace* **value** ( ) const

Return current font face.

## 5.6 TLGDFontWrapper

**Inherits:**

**Category:** Core

### 5.6.1 Brief Description

### 5.6.2 Properties

<i>TLFontFamily</i>	<i>base_font</i>	
int	<i>base_font_size</i>	12
String	<i>base_font_style</i>	“Regular”
int	<i>cache_depth</i>	100

### 5.6.3 Description

Subclass Font to use with default Godot controls, provides limited shaping support.

Note: This class is only available if module is built with `use_font_wrapper=true` flag.

### 5.6.4 Property Descriptions

- *TLFontFamily* **base\_font**

<i>Setter</i>	<code>set_base_font(value)</code>
<i>Getter</i>	<code>get_base_font()</code>

Base font to wrap.

---

- int **base\_font\_size**

<i>Default</i>	12
<i>Setter</i>	set_base_font_size(value)
<i>Getter</i>	get_base_font_size()

Base font size.

---

- String **base\_font\_style**

<i>Default</i>	“Regular”
<i>Setter</i>	set_base_font_style(value)
<i>Getter</i>	get_base_font_style()

Base font style.

---

- int **cache\_depth**

<i>Default</i>	100
<i>Setter</i>	set_cache_depth(value)
<i>Getter</i>	get_cache_depth()

Number of shaped strings to keep in cache.

## 5.7 TLICUDataLoader

**Inherits:**

**Category:** Core

### 5.7.1 Brief Description

Helper class that handles ICU data loading.

### 5.7.2 Properties

String	<i>data_path</i>	“”
--------	------------------	----

### 5.7.3 Methods

bool	<i>load</i> ( String resource_path )
------	--------------------------------------

## 5.7.4 Property Descriptions

- String **data\_path**

<i>Default</i>	""
<i>Setter</i>	set_data_path(value)
<i>Getter</i>	get_data_path()

ICU data file path.

## 5.7.5 Method Descriptions

- bool **load** ( String resource\_path )

Loads ICU data file, should be done at most once in a process, before the first ICU operation. Returns `true` if function succeeds.

## 5.8 TLLabel

**Inherits:**

**Category:** Core

### 5.8.1 Brief Description

Displays plain text in a line or wrapped inside a rectangle. For formatted text, use *TLRichTextEdit*.

Copy of Godot Label with the shaping support. TLLabel uses the same theme items as the Label.

### 5.8.2 Properties

int	<i>align</i>	0
bool	<i>autowrap</i>	false
<i>TLFontFamily</i>	<i>base_font</i>	
int	<i>base_font_size</i>	12
String	<i>base_font_style</i>	"Regular"
bool	<i>clip_text</i>	false
String	<i>language</i>	""
int	<i>lines_skipped</i>	0
int	<i>max_lines_visible</i>	-1
int	<i>mouse_filter</i>	<b>O:</b> 2
String	<i>ot_features</i>	""
float	<i>percent_visible</i>	1.0
int	<i>size_flags_vertical</i>	<b>O:</b> 4
String	<i>text</i>	""
int	<i>text_direction</i>	3
bool	<i>uppercase</i>	false
int	<i>valign</i>	0
int	<i>visible_characters</i>	-1

### 5.8.3 Methods

int	<i>get_line_count</i> ( ) const
int	<i>get_line_height</i> ( ) const
int	<i>get_total_character_count</i> ( ) const
int	<i>get_visible_line_count</i> ( ) const

### 5.8.4 Enumerations

enum **Align**:

- **ALIGN\_LEFT = 0** — Align rows to the left (default).
  - **ALIGN\_CENTER = 1** — Align rows centered.
  - **ALIGN\_RIGHT = 2** — Align rows to the right.
  - **ALIGN\_FILL = 3** — Expand row white spaces to fit the width.
- 

enum **VAlign**:

- **VALIGN\_TOP = 0** — Align the whole text to the top.
- **VALIGN\_CENTER = 1** — Align the whole text to the center.
- **VALIGN\_BOTTOM = 2** — Align the whole text to the bottom.
- **VALIGN\_FILL = 3** — Align the whole text by spreading the rows.

### 5.8.5 Description

Label displays plain text on the screen. It gives you control over the horizontal and vertical alignment, and can wrap the text inside the node's bounding rectangle. It doesn't support bold, italics or other formatting. For that, use RichTextLabel instead.

### 5.8.6 Property Descriptions

- int **align**

<i>Default</i>	0
<i>Setter</i>	set_align(value)
<i>Getter</i>	get_align()

Controls the text's horizontal align. Supports left, center, right, and fill, or justify. Set it to one of the `ALIGN_*` constants.

---

- bool **autowrap**

<i>Default</i>	false
<i>Setter</i>	set_autowrap(value)
<i>Getter</i>	has_autowrap()

If `true`, wraps the text inside the node's bounding rectangle. If you resize the node, it will change its height automatically to show all the text.

---

- *TLFontFamily* **base\_font**

<i>Setter</i>	set_base_font(value)
<i>Getter</i>	get_base_font()

Base font.

- int **base\_font\_size**

<i>Default</i>	12
<i>Setter</i>	set_base_font_size(value)
<i>Getter</i>	get_base_font_size()

Base font size.

- String **base\_font\_style**

<i>Default</i>	“Regular”
<i>Setter</i>	set_base_font_style(value)
<i>Getter</i>	get_base_font_style()

Base font style.

- bool **clip\_text**

<i>Default</i>	false
<i>Setter</i>	set_clip_text(value)
<i>Getter</i>	is_clipping_text()

If `true`, the Label only shows the text that fits inside its bounding rectangle. It also lets you scale the node down freely.

- String **language**

<i>Default</i>	“”
<i>Setter</i>	set_language(value)
<i>Getter</i>	get_language()

Language code for line-breaking and text shaping algorithms.

- int **lines\_skipped**

<i>Default</i>	0
<i>Setter</i>	set_lines_skipped(value)
<i>Getter</i>	get_lines_skipped()

The node ignores the first `lines_skipped` lines before it starts to display text.

- int **max\_lines\_visible**

<i>Default</i>	-1
<i>Setter</i>	set_max_lines_visible(value)
<i>Getter</i>	get_max_lines_visible()

Limits the lines of text the node shows on screen.

---

- String **ot\_features**

<i>Default</i>	""
<i>Setter</i>	set_ot_features(value)
<i>Getter</i>	get_ot_features()

Comma separated list of OpenType feature tags.

---

- float **percent\_visible**

<i>Default</i>	1.0
<i>Setter</i>	set_percent_visible(value)
<i>Getter</i>	get_percent_visible()

Limits the count of visible characters. If you set `percent_visible` to 50, only up to half of the text's characters will display on screen. Useful to animate the text in a dialog box.

---

- String **text**

<i>Default</i>	""
<i>Setter</i>	set_text(value)
<i>Getter</i>	get_text()

The text to display on screen.

---

- int **text\_direction**

<i>Default</i>	3
<i>Setter</i>	set_text_direction(value)
<i>Getter</i>	get_text_direction()

Base direction of the text.

---

- bool **uppercase**

<i>Default</i>	false
<i>Setter</i>	set_uppercase(value)
<i>Getter</i>	is_uppercase()

If `true`, all the text displays as UPPERCASE.

---



- int **valign**

<i>Default</i>	0
<i>Setter</i>	set_valign(value)
<i>Getter</i>	get_valign()

Controls the text's vertical align. Supports top, center, bottom, and fill. Set it to one of the `VALIGN_*` constants.

- int **visible\_characters**

<i>Default</i>	-1
<i>Setter</i>	set_visible_characters(value)
<i>Getter</i>	get_visible_characters()

Restricts the number of characters to display. Set to -1 to disable.

## 5.8.7 Method Descriptions

- int **get\_line\_count** ( ) const

Returns the amount of lines of text the Label has.

- int **get\_line\_height** ( ) const

Returns the of the line in pixels.

- int **get\_total\_character\_count** ( ) const

Returns the total number of printable characters in the text.

- int **get\_visible\_line\_count** ( ) const

Returns the number of lines shown. Useful if the Label's height cannot currently display all lines.

## 5.9 TLLineEdit

**Inherits:**

**Category:** Core

### 5.9.1 Brief Description

Control that provides single-line string editing. For formatted or/and multiline text, use *TLLRichTextEdit*.

Copy of Godot LineEdit with the shaping support. TLLineEdit uses the same theme items as the LineEdit.

## 5.9.2 Properties

int	<i>align</i>	0
<i>TLFontFamily</i>	<i>base_font</i>	
int	<i>base_font_size</i>	12
String	<i>base_font_style</i>	“Regular”
bool	<i>caret_blink</i>	false
float	<i>caret_blink_speed</i>	0.65
int	<i>caret_position</i>	0
bool	<i>clear_button_enabled</i>	false
bool	<i>context_menu_enabled</i>	true
bool	<i>editable</i>	true
bool	<i>expand_to_text_length</i>	false
int	<i>focus_mode</i>	<b>O:</b> 2
String	<i>language</i>	“”
int	<i>max_length</i>	0
Control.CursorShape	<i>mouse_default_cursor_shape</i>	<b>O:</b> 1
String	<i>ot_features</i>	“”
float	<i>placeholder_alpha</i>	0.6
String	<i>placeholder_text</i>	“”
bool	<i>secret</i>	false
String	<i>secret_character</i>	“*”
String	<i>text</i>	“”
int	<i>text_direction</i>	3

## 5.9.3 Methods

void	<i>append_at_cursor</i> ( String text )
void	<i>clear</i> ( )
void	<i>deselect</i> ( )
PopupMenu	<i>get_menu</i> ( ) const
void	<i>menu_option</i> ( int option )
void	<i>select</i> ( int from=0, int to=-1 )
void	<i>select_all</i> ( )

## 5.9.4 Signals

- **text\_changed** ( String new\_text )

Emitted when the text changes.

---

- **text\_entered** ( String new\_text )

Emitted when the user presses KEY\_ENTER on the TLLineEdit.

## 5.9.5 Enumerations

enum **Align**:

- **ALIGN\_LEFT** = 0 — Aligns the text on the left-hand side of the TLLineEdit.
- **ALIGN\_CENTER** = 1 — Centers the text in the middle of the TLLineEdit.
- **ALIGN\_RIGHT** = 2 — Aligns the text on the right-hand side of the TLLineEdit.

- **ALIGN\_FILL = 3** — Stretches white spaces to fit the `TLLineEdit`'s width.

enum **MenuItems**:

- **MENU\_CUT = 0** — Cuts (copies and clears) the selected text.
- **MENU\_COPY = 1** — Copies the selected text.
- **MENU\_PASTE = 2** — Pastes the clipboard text over the selected text (or at the cursor's position).

Non-printable escape characters are automatically stripped from the OS clipboard via `String.strip_escapes`.

- **MENU\_CLEAR = 3** — Erases the whole `TLLineEdit` text.
- **MENU\_SELECT\_ALL = 4** — Selects the whole `TLLineEdit` text.
- **MENU\_UNDO = 5** — Undoes the previous action.
- **MENU\_REDO = 6** — Reverse the last undo action.
- **MENU\_MAX = 7** — Represents the size of the *MenuItems* enum.

## 5.9.6 Description

`TLLineEdit` provides a single-line string editor, used for text fields. It features many built-in shortcuts which will always be available:

- Ctrl + C: Copy
- Ctrl + X: Cut
- Ctrl + V or Ctrl + Y: Paste/"yank"
- Ctrl + Z: Undo
- Ctrl + Shift + Z: Redo
- Ctrl + U: Delete text from the cursor position to the beginning of the line
- Ctrl + K: Delete text from the cursor position to the end of the line
- Ctrl + A: Select all text
- Ctrl + D: Swap current input direction (primary cursor)
- Up/Down arrow: Move the cursor to the beginning/end of the line

## 5.9.7 Property Descriptions

- **int align**

<i>Default</i>	0
<i>Setter</i>	<code>set_align(value)</code>
<i>Getter</i>	<code>get_align()</code>

Text alignment as defined in the `ALIGN_*` enum.

- *TLFontFamily* **base\_font**

<i>Setter</i>	<code>set_base_font(value)</code>
<i>Getter</i>	<code>get_base_font()</code>

Base font.

- int **base\_font\_size**

<i>Default</i>	12
<i>Setter</i>	set_base_font_size(value)
<i>Getter</i>	get_base_font_size()

Base font size.

- String **base\_font\_style**

<i>Default</i>	“Regular”
<i>Setter</i>	set_base_font_style(value)
<i>Getter</i>	get_base_font_style()

Base font style.

- bool **caret\_blink**

<i>Default</i>	false
<i>Setter</i>	cursor_set_blink_enabled(value)
<i>Getter</i>	cursor_get_blink_enabled()

If `true`, the caret (visual cursor) blinks.

- float **caret\_blink\_speed**

<i>Default</i>	0.65
<i>Setter</i>	cursor_set_blink_speed(value)
<i>Getter</i>	cursor_get_blink_speed()

Duration (in seconds) of a caret’s blinking cycle.

- int **caret\_position**

<i>Default</i>	0
<i>Setter</i>	set_cursor_position(value)
<i>Getter</i>	get_cursor_position()

The cursor’s position inside the `TLLineEdit`. When set, the text may scroll to accommodate it.

- bool **clear\_button\_enabled**

<i>Default</i>	false
<i>Setter</i>	set_clear_button_enabled(value)
<i>Getter</i>	is_clear_button_enabled()

If `true`, the `TLLineEdit` will show a clear button if `text` is not empty.

- bool **context\_menu\_enabled**

<i>Default</i>	true
<i>Setter</i>	set_context_menu_enabled(value)
<i>Getter</i>	is_context_menu_enabled()

If `true`, the context menu will appear when right-clicked.

- bool **editable**

<i>Default</i>	true
<i>Setter</i>	set_editable(value)
<i>Getter</i>	is_editable()

If `false`, existing text cannot be modified and new text cannot be added.

- bool **expand\_to\_text\_length**

<i>Default</i>	false
<i>Setter</i>	set_expand_to_text_length(value)
<i>Getter</i>	get_expand_to_text_length()

If `true`, the `TLLineEdit` width will increase to stay longer than the `text`. It will **not** compress if the `text` is shortened.

- String **language**

<i>Default</i>	""
<i>Setter</i>	set_language(value)
<i>Getter</i>	get_language()

Language code for line-breaking and text shaping algorithms.

- int **max\_length**

<i>Default</i>	0
<i>Setter</i>	set_max_length(value)
<i>Getter</i>	get_max_length()

Maximum amount of characters that can be entered inside the `LineEdit`. If 0, there is no limit.

- String **ot\_features**

<i>Default</i>	""
----------------	----

Continued on next page

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<i>Setter</i>	set_ot_features(value)
<i>Getter</i>	get_ot_features()

Comma separated list of OpenType feature tags.

---

- float **placeholder\_alpha**

<i>Default</i>	0.6
<i>Setter</i>	set_placeholder_alpha(value)
<i>Getter</i>	get_placeholder_alpha()

Opacity of the *placeholder\_text*. From 0 to 1.

---

- String **placeholder\_text**

<i>Default</i>	“”
<i>Setter</i>	set_placeholder(value)
<i>Getter</i>	get_placeholder()

Text shown when the `TLLineEdit` is empty. It is **not** the `TLLineEdit`’s default value (see *text*).

---

- bool **secret**

<i>Default</i>	false
<i>Setter</i>	set_secret(value)
<i>Getter</i>	is_secret()

If `true`, every character is replaced with the secret character (see *secret\_character*).

---

- String **secret\_character**

<i>Default</i>	“*”
<i>Setter</i>	set_secret_character(value)
<i>Getter</i>	get_secret_character()

The character to use to mask secret input (defaults to “\*”). Only a single character can be used as the secret character.

---

- String **text**

<i>Default</i>	“”
<i>Setter</i>	set_text(value)
<i>Getter</i>	get_text()

String value of the `TLLineEdit`.

---

- int **text\_direction**

<i>Default</i>	3
<i>Setter</i>	set_text_direction(value)
<i>Getter</i>	get_text_direction()

Base direction of the text.

### 5.9.8 Method Descriptions

- void **append\_at\_cursor** ( String text )

Adds `text` after the cursor. If the resulting value is longer than *max\_length*, nothing happens.

- void **clear** ( )

Erases the `TLLineEdit` text.

- void **deselect** ( )

Clears the current selection.

- PopupMenu **get\_menu** ( ) const

Returns the PopupMenu of this `TLLineEdit`. By default, this menu is displayed when right-clicking on the `TLLineEdit`.

- void **menu\_option** ( int option )

Executes a given action as defined in the “MENU\_\*” enum.

- void **select** ( int from=0, int to=-1 )

Selects characters inside `TLLineEdit` between `from` and `to`. By default, `from` is at the beginning and `to` at the end.

```
text = "Welcome"
select()      # Will select "Welcome"
select(4)     # Will select "ome"
select(2, 5)  # Will select "lco"
```

- void **select\_all** ( )

Selects the whole String.

## 5.10 TLRichTextEdit

**Inherits:**

**Category:** Core

### 5.10.1 Brief Description

Rich text display and input control.

Rich text can contain custom text, fonts, images and formatting.

### 5.10.2 Properties

Color	<i>back_color</i>	Color( 1, 1, 1, 0 )
Control.FocusMode	<i>focus_mode</i>	<b>O:</b> 2
float	<i>paragraph_spacing</i>	3.0
bool	<i>readonly</i>	false
bool	<i>selectable</i>	true
<i>TLShapedParagraph</i>	<i>paragraphs/{index}</i>	

### 5.10.3 Methods

void	<i>add_attribute</i> ( <i>TLRichTextEditSelection</i> selection, int attribute, Variant value )
void	<i>clear</i> ( )
void	<i>debug_draw</i> ( RID rid, Vector2 position, Vector2 hit_position, bool draw_brk_ops, bool draw_jst_ops )
void	<i>debug_draw_as_hex</i> ( RID rid, Vector2 position, Vector2 hit_position, bool draw_brk_ops, bool draw_jst_ops )
void	<i>debug_draw_logical_as_hex</i> ( RID rid, Vector2 position, Vector2 hit_position, bool draw_brk_ops, bool draw_jst_ops )
Vector2	<i>get_caret_position</i> ( )
String	<i>get_cluster_debug_info_hit_test</i> ( Vector2 position )
Array	<i>get_cluster_glyphs_hit_test</i> ( Vector2 position )
Rect2	<i>get_cluster_rect_hit_test</i> ( Vector2 position )
<i>TLShapedParagraph</i>	<i>get_paragraph</i> ( int index ) const
int	<i>get_paragraphs</i> ( )
<i>TLRichTextEditSelection</i>	<i>get_selection</i> ( ) const
int	<i>insert_paragraph</i> ( <i>TLShapedParagraph</i> para, int index )
void	<i>remove_attribute</i> ( <i>TLRichTextEditSelection</i> selection, int attribute )
void	<i>remove_attributes</i> ( <i>TLRichTextEditSelection</i> selection )
void	<i>remove_paragraph</i> ( int index )
void	<i>replace_sstring</i> ( <i>TLRichTextEditSelection</i> selection, <i>TLShapedString</i> text )
void	<i>replace_text</i> ( <i>TLRichTextEditSelection</i> selection, String text )
void	<i>replace_utf16</i> ( <i>TLRichTextEditSelection</i> selection, PoolByteArray text )
void	<i>replace_utf32</i> ( <i>TLRichTextEditSelection</i> selection, PoolByteArray text )
void	<i>replace_utf8</i> ( <i>TLRichTextEditSelection</i> selection, PoolByteArray text )
void	<i>set_paragraph</i> ( <i>TLShapedParagraph</i> para, int index )
void	<i>set_paragraph_back_color</i> ( <i>TLRichTextEditSelection</i> selection, Color bcolor )
void	<i>set_paragraph_brk_flags</i> ( <i>TLRichTextEditSelection</i> selection, int flags )
void	<i>set_paragraph_halign</i> ( <i>TLRichTextEditSelection</i> selection, int halign )
void	<i>set_paragraph_indent</i> ( <i>TLRichTextEditSelection</i> selection, float indent )
void	<i>set_paragraph_jst_flags</i> ( <i>TLRichTextEditSelection</i> selection, int flags )
void	<i>set_paragraph_line_spacing</i> ( <i>TLRichTextEditSelection</i> selection, float line_spacing )
void	<i>set_paragraph_width</i> ( <i>TLRichTextEditSelection</i> selection, float width )
void	<i>set_selection</i> ( <i>TLRichTextEditSelection</i> selection )



### 5.10.4 Signals

- **cursor\_changed ( )**

Emitted when caret moves or selection changes.

---

- **paragraph\_changed ( )**

Emitted when paragraph text or attributes changes.

### 5.10.5 Property Descriptions

- Color **back\_color**

<i>Default</i>	Color( 1, 1, 1, 0 )
<i>Setter</i>	set_back_color(value)
<i>Getter</i>	get_back_color()

Background color of the control.

---

- float **paragraph\_spacing**

<i>Default</i>	3.0
<i>Setter</i>	set_paragraph_spacing(value)
<i>Getter</i>	get_paragraph_spacing()

Spacing between the paragraphs in pixels.

---

- bool **readonly**

<i>Default</i>	false
<i>Setter</i>	set_readonly(value)
<i>Getter</i>	get_readonly()

If `true`, existing text cannot be modified and new text cannot be added.

---

- bool **selectable**

<i>Default</i>	true
<i>Setter</i>	set_selectable(value)
<i>Getter</i>	get_selectable()

If `true`, the control allows text selection.

---

- *TLShapedParagraph* **paragraphs/{index}**

Paragraphs of the text.

## 5.10.6 Method Descriptions

- void **add\_attribute** ( *TLRichTextEditSelection* selection, int attribute, Variant value )

Sets `attribute` attribute to `value` for the selection.

---

- void **clear** ( )

Clears the attributes and sets text to an empty string.

---

- void **debug\_draw** ( RID rid, Vector2 position, Vector2 hit\_position, bool draw\_brk\_ops, bool draw\_jst\_ops )

DEBUG : Draws text with additional debug information.

---

- void **debug\_draw\_as\_hex** ( RID rid, Vector2 position, Vector2 hit\_position, bool draw\_brk\_ops, bool draw\_jst\_ops )

DEBUG : Draws text using “hexbox” fallback font.

---

- void **debug\_draw\_logical\_as\_hex** ( RID rid, Vector2 position, Vector2 hit\_position, bool draw\_brk\_ops, bool draw\_jst\_ops )

DEBUG : Draws logical character codes of the text with additional debug information.

---

- Vector2 **get\_caret\_position** ( )

Returns position of the caret, in (paragraph, offset) format.

---

- String **get\_cluster\_debug\_info\_hit\_test** ( Vector2 position )

DEBUG : Returns cluster hit test info.

---

- Array **get\_cluster\_glyphs\_hit\_test** ( Vector2 position )

Returns glyph hit test info.

---

- Rect2 **get\_cluster\_rect\_hit\_test** ( Vector2 position )

Returns replacement object hit test info.

---

- *TLShapedParagraph* **get\_paragraph** ( int index ) const

Returns paragraph of text.

---

- int **get\_paragraphs** ( )

Returns number of paragraph in the text.

---

- *TLRichTextEditSelection* **get\_selection** ( ) const

Returns current selection and caret position.

---

- int **insert\_paragraph** ( *TLShapedParagraph* para, int index )

Inserts paragraph of text at the index position.

---

- void **remove\_attribute** ( *TLRichTextEditSelection* selection, int attribute )

Returns `attribute` attribute value in the selection.

---

- void **remove\_attributes** ( *TLRichTextEditSelection* selection )

Removes all attributes in the selection.

---

- void **remove\_paragraph** ( int index )

Removes paragraph of the text.

---

- void **replace\_sstring** ( *TLRichTextEditSelection* selection, *TLShapedString* text )

Replaces selection with the shaped string.

---

- void **replace\_text** ( *TLRichTextEditSelection* selection, String text )

Replaces selection with the plain string.

---

- void **replace\_utf16** ( *TLRichTextEditSelection* selection, PoolByteArray text )

Replaces selection with the contents of the raw UTF-16 encoded string.

---

- void **replace\_utf32** ( *TLRichTextEditSelection* selection, PoolByteArray text )

Replaces selection with the contents of the raw UTF-32 encoded string.

---

- void **replace\_utf8** ( *TLRichTextEditSelection* selection, PoolByteArray text )

Replaces selection with the contents of the raw UTF-8 encoded string.

---

- void **set\_paragraph** ( *TLShapedParagraph* para, int index )

Sets content of the specific paragraph.

---

- void **set\_paragraph\_back\_color** ( *TLRichTextEditSelection* selection, Color bcolor )

Sets background color of the paragraph.

---

- void **set\_paragraph\_brk\_flags** ( *TLRichTextEditSelection* selection, int flags )

Sets line breaking flags of the paragraph.

---

- void **set\_paragraph\_halign** ( *TLRichTextEditSelection* selection, int halign )

Sets horizontal alignment of the paragraph.

---

- void **set\_paragraph\_indent** ( *TLRichTextEditSelection* selection, float indent )

Sets indentation of the paragraph.

---

- void **set\_paragraph\_jst\_flags** ( *TLRichTextEditSelection* selection, int flags )

Sets justification flags of the paragraph.

---

- void **set\_paragraph\_line\_spacing** ( *TLRichTextEditSelection* selection, float line\_spacing )

Sets line spacing of the paragraph.

---

- void **set\_paragraph\_width** ( *TLRichTextEditSelection* selection, float width )

Sets max width of the paragraph.

---

- void **set\_selection** ( *TLRichTextEditSelection* selection )

Sets current selection.

---

## 5.11 TLRichTextEditSelection

**Inherits:**

**Category:** Core

### 5.11.1 Brief Description

Selection and caret info of the *TLRichTextEdit*

### 5.11.2 Properties

int	<i>caret_offset</i>	0
int	<i>caret_para</i>	0
int	<i>end_offset</i>	0
int	<i>end_para</i>	0
int	<i>start_offset</i>	0
int	<i>start_para</i>	0

### 5.11.3 Signals

- **selection\_changed** ( )

Emitted when selection range is changed or caret moved.

### 5.11.4 Property Descriptions

- int **caret\_offset**

<i>Default</i>	0
<i>Setter</i>	set_caret_offset(value)
<i>Getter</i>	get_caret_offset()

Caret position in the paragraph *caret\_para*.

- int **caret\_para**

<i>Default</i>	0
<i>Setter</i>	set_caret_para(value)
<i>Getter</i>	get_caret_para()

Paragraph where caret currently is in.

- int **end\_offset**

<i>Default</i>	0
<i>Setter</i>	set_end_offset(value)
<i>Getter</i>	get_end_offset()

Offset of the end of selection in the paragraph *end\_para*.

- int **end\_para**

<i>Default</i>	0
<i>Setter</i>	set_end_para(value)
<i>Getter</i>	get_end_para()

Last paragraph in the selection.

- int **start\_offset**

<i>Default</i>	0
<i>Setter</i>	set_start_offset(value)
<i>Getter</i>	get_start_offset()

Offset of the start of selection in the paragraph *start\_para*.

- int **start\_para**

<i>Default</i>	0
<i>Setter</i>	set_start_para(value)
<i>Getter</i>	get_start_para()

First paragraph in the selection.

## 5.12 TLShapedAttributedString

**Inherits:** *TLShapedString*

**Category:** Core

### 5.12.1 Brief Description

Golds shaped line of text with associated attributes.

### 5.12.2 Properties

Array	<i>attributes_dict</i>
int	<i>attribute/type</i>
Variant	<i>attribute/value</i>
int	<i>attribute/start</i>
int	<i>attribute/end</i>

### 5.12.3 Methods

void	<i>add_attribute</i> ( int attribute, Variant value, int start, int end )
void	<i>clear_attributes</i> ( )
void	<i>commit_attribute</i> ( )
Variant	<i>get_attribute</i> ( int attribute, int index ) const
int	<i>get_attribute_end</i> ( int attribute, int index ) const
int	<i>get_attribute_start</i> ( int attribute, int index ) const
Array	<i>get_embedded_rects</i> ( )
bool	<i>has_attribute</i> ( int attribute, int index ) const
void	<i>load_attributes_dict</i> ( Array array )
void	<i>remove_attribute</i> ( int attribute, int start, int end )
void	<i>remove_attributes</i> ( int start, int end )
Array	<i>save_attributes_dict</i> ( ) const

### 5.12.4 Enumerations

enum **TextAttribute**:

- **TEXT\_ATTRIBUTE\_FONT = 1** — Font family. Attribute type: *TLFontFamily*
- **TEXT\_ATTRIBUTE\_FONT\_STYLE = 2** — Font style (Regular, Bold, Italic, Oblique etc.). Attribute type: String
- **TEXT\_ATTRIBUTE\_FONT\_SIZE = 3** — Font size. Attribute type: *int*
- **TEXT\_ATTRIBUTE\_FONT\_FEATURES = 4** — Comma separated list of OpenType feature tags. More info: <https://docs.microsoft.com/en-us/typography/opentype/spec/featuretags>. Attribute type: String
- **TEXT\_ATTRIBUTE\_LANGUAGE = 5** — Language code for line-breaking and text shaping algorithms. Attribute type: String
- **TEXT\_ATTRIBUTE\_REPLACEMENT\_IMAGE = 6** — Embedded image. Attribute type: Texture

- **TEXT\_ATTRIBUTE\_REPLACEMENT\_RECT = 7** — Reserved space for custom embedded object. Attribute type: Vector2
- **TEXT\_ATTRIBUTE\_REPLACEMENT\_ID = 8** — Embedded object id key. Attribute type: Variant
- **TEXT\_ATTRIBUTE\_REPLACEMENT\_VALIGN = 9** — Embedded image/object inline alignment. Attribute type: TEXT\_VALIGN\_\*
- **TEXT\_ATTRIBUTE\_COLOR = 31** — Text color. Attribute type: Color
- **TEXT\_ATTRIBUTE\_OUTLINE\_COLOR = 32** — Text outline color. Attribute type: Color
- **TEXT\_ATTRIBUTE\_UNDERLINE\_COLOR = 41** — Underline color. Attribute type: Color
- **TEXT\_ATTRIBUTE\_UNDERLINE\_WIDTH = 42** — Underline width. Attribute type: int
- **TEXT\_ATTRIBUTE\_STRIKETHROUGH\_COLOR = 51** — Strike through line color. Attribute type: Color
- **TEXT\_ATTRIBUTE\_STRIKETHROUGH\_WIDTH = 52** — Strike through line width. Attribute type: int
- **TEXT\_ATTRIBUTE\_OVERLINE\_COLOR = 61** — Overline color/ Attribute type: Color
- **TEXT\_ATTRIBUTE\_OVERLINE\_WIDTH = 62** — Overline width. Attribute type: int
- **TEXT\_ATTRIBUTE\_HIGHLIGHT\_COLOR = 71** — Highlight color. Attribute type: Color
- **TEXT\_ATTRIBUTE\_META = 100** — User defined data, use TEXT\_ATTRIBUTE\_META + x to define multiple user attributes. Attribute type: Variant

enum TextValign:

- **TEXT\_VALIGN\_TOP = 0** — Inline vertical top alignment.
- **TEXT\_VALIGN\_CENTER = 1** — Inline vertical center alignment.
- **TEXT\_VALIGN\_BOTTOM = 2** — Inline vertical bottom alignment.

### 5.12.5 Property Descriptions

- Array **attributes\_dict**

Setter	load_attributes_dict(value)
Getter	save_attributes_dict()

Array of attribute Dictionary.

- int **attribute/type**

Temporary attribute type, temporary attributes can be committed to the string by calling *commit\_attribute*.

- Variant **attribute/value**

Temporary attribute value, temporary attributes can be committed to the string by calling *commit\_attribute*.

- int **attribute/start**

Temporary attribute start offset, temporary attributes can be committed to the string by calling *commit\_attribute*.

- int **attribute/end**

Temporary attribute end offset, temporary attributes can be committed to the string by calling *commit\_attribute*.

## 5.12.6 Method Descriptions

- void **add\_attribute** ( int attribute, Variant value, int start, int end )

Sets *attribute* attribute to *value* for specified text range.

---

- void **clear\_attributes** ( )

Removes all attributes.

---

- void **commit\_attribute** ( )
- 

- Variant **get\_attribute** ( int attribute, int index ) const

Returns *attribute* attribute value for specified text position.

---

- int **get\_attribute\_end** ( int attribute, int index ) const

Returns last position of *attribute* attribute run enclosing specified position.

---

- int **get\_attribute\_start** ( int attribute, int index ) const

Returns first position of *attribute* attribute run enclosing specified position.

---

- Array **get\_embedded\_rects** ( )

Returns bounding rectangles of embedded objects (TEXT\_ATTRIBUTE\_REPLACEMENT\_RECT attributes).

---

- bool **has\_attribute** ( int attribute, int index ) const

Returns *true* if specified position has *attribute* attribute set.

---

- void **load\_attributes\_dict** ( Array array )

Loads attributes from Array of Dictionary.

---

- void **remove\_attribute** ( int attribute, int start, int end )

Removes *attribute* attribute for specified text range.

---

- void **remove\_attributes** ( int start, int end )

Removes all attributes for specified text range.

---

- Array **save\_attributes\_dict** ( ) const

Stores string attributes into Array of Dictionary.

---



## 5.13 TLShapedParagraph

**Inherits:**

**Category:** Core

### 5.13.1 Brief Description

Class for formatting entire paragraphs of text at once.

### 5.13.2 Properties

Color	<i>back_color</i>	Color( 1, 1, 1, 0 )
int	<i>brk_flags</i>	2
int	<i>halign</i>	0
float	<i>indent</i>	0.0
int	<i>jst_flags</i>	1
float	<i>line_spacing</i>	1.0
<i>TLShapedAttributedString</i>	<i>string</i>	
float	<i>width</i>	-1.0

### 5.13.3 Methods

void	<i>copy_properties</i> ( <i>TLShapedParagraph</i> source )
<i>TLShapedAttributedString</i>	<i>get_line</i> ( int index ) const
Array	<i>get_line_bounds</i> ( ) const
int	<i>get_lines</i> ( ) const
Vector2	<i>get_size</i> ( ) const
Array	<i>get_word_bounds</i> ( ) const

### 5.13.4 Signals

- **paragraph\_changed** ( )

Emitted when text or attributes of the paragraph are changed.

### 5.13.5 Enumerations

enum **ParaHAlign**:

- **PARA\_HALIGN\_LEFT** = 0 — Align rows to the left (default).
- **PARA\_HALIGN\_CENTER** = 1 — Align rows centered.
- **PARA\_HALIGN\_RIGHT** = 2 — Align rows to the right.
- **PARA\_HALIGN\_FILL** = 3 — Expand row white spaces to fit the width.

### 5.13.6 Property Descriptions

- Color **back\_color**

<i>Default</i>	Color( 1, 1, 1, 0 )
<i>Setter</i>	set_back_color(value)
<i>Getter</i>	get_back_color()

Background color of the paragraph.

---

- int **brk\_flags**

<i>Default</i>	2
<i>Setter</i>	set_brk_flags(value)
<i>Getter</i>	get_brk_flags()

Line breaking flags.

---

- int **halign**

<i>Default</i>	0
<i>Setter</i>	set_halign(value)
<i>Getter</i>	get_halign()

Horizontal alignment.

---

- float **indent**

<i>Default</i>	0.0
<i>Setter</i>	set_indent(value)
<i>Getter</i>	get_indent()

Indentation.

---

- int **jst\_flags**

<i>Default</i>	1
<i>Setter</i>	set_jst_flags(value)
<i>Getter</i>	get_jst_flags()

Justification flags.

---

- float **line\_spacing**

<i>Default</i>	1.0
<i>Setter</i>	set_line_spacing(value)
<i>Getter</i>	get_line_spacing()

Line spacing in pixels.

---

- *TLShapedAttributedString* **string**

<i>Setter</i>	set_string(value)
<i>Getter</i>	get_string()

Text and text attributes of the paragraph.

- float **width**

<i>Default</i>	-1.0
<i>Setter</i>	set_width(value)
<i>Getter</i>	get_width()

Max width of the paragraph.

### 5.13.7 Method Descriptions

- void **copy\_properties** ( *TLShapedParagraph* source )

Copies properties of the another paragraph.

- *TLShapedAttributedString* **get\_line** ( int index ) const

Returns line of the paragraphs.

- Array **get\_line\_bounds** ( ) const

Returns array of the line boundaries as `Vector2 (start, end)`.

- int **get\_lines** ( ) const

Returns number of lines in the paragraph.

- `Vector2` **get\_size** ( ) const

Returns size of the paragraph in pixels.

- Array **get\_word\_bounds** ( ) const

Returns array of the word boundaries as `Vector2 (start, end)`.

## 5.14 TLShapedString

**Inherits:**

**Inherited By:** *TLShapedAttributedString*

**Category:** Core

### 5.14.1 Brief Description

Holds shaped line of plain text.

## 5.14.2 Properties

int	<i>base_direction</i>	3
<i>TLFontFamily</i>	<i>base_font</i>	
int	<i>base_font_size</i>	12
String	<i>base_font_style</i>	“Regular”
String	<i>features</i>	“”
String	<i>language</i>	“en”
bool	<i>preserve_control</i>	false
String	<i>text</i>	“”

## 5.14.3 Methods

void	<i>add_sstring</i> ( <i>TLShapedString</i> text )
void	<i>add_text</i> ( String text )
void	<i>add_utf16</i> ( PoolByteArray text )
void	<i>add_utf32</i> ( PoolByteArray text )
void	<i>add_utf8</i> ( PoolByteArray text )
Array	<i>break_jst</i> ( ) const
Array	<i>break_lines</i> ( float width, int flags ) const
Array	<i>break_words</i> ( ) const
int	<i>char_count</i> ( ) const
int	<i>clusters</i> ( ) const
void	<i>copy_properties</i> ( <i>TLShapedString</i> source )
void	<i>draw</i> ( RID canvas_item, Vector2 position, Color modulate )
void	<i>draw_as_hex</i> ( RID canvas_item, Vector2 position, Color modulate, bool draw_brk_ops, bool draw_jst_ops )
Vector2	<i>draw_cluster</i> ( RID canvas_item, Vector2 position, int index, Color modulate )
void	<i>draw_dbg</i> ( RID canvas_item, Vector2 position, Color modulate, bool draw_brk_ops, bool draw_jst_ops )
void	<i>draw_logical_as_hex</i> ( RID canvas_item, Vector2 position, Color modulate, bool draw_brk_ops, bool draw_jst_ops )
bool	<i>empty</i> ( ) const
float	<i>extend_to_width</i> ( float width, int flags )
float	<i>get_ascent</i> ( ) const
<i>TextDirection</i>	<i>get_char_direction</i> ( int position ) const
float	<i>get_cluster_ascent</i> ( int index ) const
String	<i>get_cluster_debug_info</i> ( int index ) const
float	<i>get_cluster_descent</i> ( int index ) const
int	<i>get_cluster_end</i> ( int index ) const
<i>TLFontFace</i>	<i>get_cluster_face</i> ( int position ) const
float	<i>get_cluster_face_size</i> ( int position ) const
int	<i>get_cluster_glyph</i> ( int index, int glyph ) const
Vector2	<i>get_cluster_glyph_advance</i> ( int index, int glyph ) const
Vector2	<i>get_cluster_glyph_offset</i> ( int index, int glyph ) const
int	<i>get_cluster_glyphs</i> ( int index ) const
float	<i>get_cluster_height</i> ( int index ) const
int	<i>get_cluster_index</i> ( int position ) const
float	<i>get_cluster_leading_edge</i> ( int index ) const
Rect2	<i>get_cluster_rect</i> ( int index ) const
int	<i>get_cluster_start</i> ( int index ) const
float	<i>get_cluster_trailing_edge</i> ( int index ) const
float	<i>get_cluster_width</i> ( int index ) const

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Array	<i>get_cursor_positions</i> ( int position, int primary_dir ) const
float	<i>get_descent</i> ( ) const
float	<i>get_height</i> ( ) const
Array	<i>get_highlight_shapes</i> ( int start, int end ) const
int	<i>get_para_direction</i> ( ) const
PoolByteArray	<i>get_utf16</i> ( ) const
PoolByteArray	<i>get_utf32</i> ( ) const
PoolByteArray	<i>get_utf8</i> ( ) const
float	<i>get_width</i> ( ) const
int	<i>hit_test</i> ( float position ) const
int	<i>hit_test_cluster</i> ( float position ) const
bool	<i>is_valid</i> ( ) const
int	<i>length</i> ( ) const
int	<i>next_safe_bound</i> ( int position ) const
int	<i>pos_u16_to_wcs</i> ( int position ) const
int	<i>pos_wcs_to_u16</i> ( int position ) const
int	<i>prev_safe_bound</i> ( int position ) const
void	<i>replace_sstring</i> ( int start, int end, <i>TLShapedString</i> text )
void	<i>replace_text</i> ( int start, int end, String text )
void	<i>replace_utf16</i> ( int start, int end, PoolByteArray text )
void	<i>replace_utf32</i> ( int start, int end, PoolByteArray text )
void	<i>replace_utf8</i> ( int start, int end, PoolByteArray text )
void	<i>set_utf16</i> ( PoolByteArray data )
void	<i>set_utf32</i> ( PoolByteArray data )
void	<i>set_utf8</i> ( PoolByteArray data )
bool	<i>shape</i> ( )
<i>TLShapedString</i>	<i>substr</i> ( int start, int end, int trim ) const

### 5.14.4 Signals

- **string\_changed** ( )

Emitted when the text or/and other property of the string changes.

- **string\_shaped** ( )

Emitted when the text shaping process is completed.

### 5.14.5 Enumerations

enum **TextDirection**:

- **TEXT\_DIRECTION\_LTR = 0** — Left-to-right text writing direction.
- **TEXT\_DIRECTION\_RTL = 1** — Right-to-left text writing direction.
- **TEXT\_DIRECTION\_LOCALE = 2** — Text writing direction is derived from the locale's script according to the CLDR metadata.
- **TEXT\_DIRECTION\_AUTO = 3** — Text writing direction is derived from the first character in the string with BiDi class L, R, or AL or locale's script if text is not strongly directional.
- **TEXT\_DIRECTION\_INVALID = 4** — Invalid text direction (Used as return value only).

enum **TextJustification**:

- **TEXT\_JUSTIFICATION\_NONE = 0** — No text justification.

- **TEXT\_JUSTIFICATION\_KASHIDA\_AND\_WHITESPACE = 1** — Use kashida and white space elongation to justify text.
  - **TEXT\_JUSTIFICATION\_KASHIDA\_ONLY = 2** — Use kashida elongation to justify text.
  - **TEXT\_JUSTIFICATION\_WHITESPACE\_ONLY = 3** — Use white space elongation to justify text.
  - **TEXT\_JUSTIFICATION\_KASHIDA\_AND\_WHITESPACE\_AND\_INTERCHAR = 4** — Use kashida, white space and inter character elongation to justify text.
  - **TEXT\_JUSTIFICATION\_KASHIDA\_AND\_INTERCHAR = 5** — Use kashida and inter character elongation to justify text.
  - **TEXT\_JUSTIFICATION\_WHITESPACE\_AND\_INTERCHAR = 6** — Use white space and inter character elongation to justify text.
  - **TEXT\_JUSTIFICATION\_INTERCHAR\_ONLY = 7** — Use inter character elongation to justify text.
- 

enum **TextBreak**:

- **TEXT\_BREAK\_NONE = 0** — No line breaking.
  - **TEXT\_BREAK\_MANDATORY = 1** — Break lines only at mandatory break points.
  - **TEXT\_BREAK\_MANDATORY\_AND\_WORD\_BOUND = 2** — Break lines at mandatory break points and word boundaries.
  - **TEXT\_BREAK\_MANDATORY\_AND\_ANYWHERE = 3** — Break lines at mandatory break points and grapheme cluster boundaries.
- 

enum **TextTrimMode**:

- **TEXT\_TRIM\_NONE = 0** — No substring trimming.
- **TEXT\_TRIM\_BREAK = 1** — Trim line break characters for substring ends.
- **TEXT\_TRIM\_BREAK\_AND\_WHITESPACE = 2** — Trim line break and white space characters for substring ends.

## 5.14.6 Description

Note 1: Code points, Characters, Clusters and Glyphs

- A code point is a single encoding UTF-16 unit (Unicode character or half of the surrogate pair).
- A character is a full Unicode character.
- A grapheme cluster is the abstract unit of a writing system (a letter, a digit, or punctuation).
- A glyph is a shape used to render a character or a sequence of characters.

In general, code point, characters, clusters and glyphs do not have one-to-one correspondence.

Note 2: Encoding

TLShapedString uses UTF-16 encoding, all positions accepted and returned by TLShapedString function are measured in UTF-16 code points.

## 5.14.7 Property Descriptions

- **int base\_direction**

<i>Default</i>	3
<i>Setter</i>	set_base_direction(value)
<i>Getter</i>	get_base_direction()

Base text writing direction.

- *TLFontFamily* **base\_font**

<i>Setter</i>	set_base_font(value)
<i>Getter</i>	get_base_font()

Base font family reference.

- int **base\_font\_size**

<i>Default</i>	12
<i>Setter</i>	set_base_font_size(value)
<i>Getter</i>	get_base_font_size()

Font size.

- String **base\_font\_style**

<i>Default</i>	“Regular”
<i>Setter</i>	set_base_font_style(value)
<i>Getter</i>	get_base_font_style()

Style name (Regular, Bold, Italic, Oblique etc.).

- String **features**

<i>Default</i>	“,”
<i>Setter</i>	set_features(value)
<i>Getter</i>	get_features()

Comma separated list of OpenType feature tags. More info: <https://docs.microsoft.com/en-us/typography/opentype/spec/featuretags>.

- String **language**

<i>Default</i>	“en”
<i>Setter</i>	set_language(value)
<i>Getter</i>	get_language()

Language code for line-breaking and text shaping algorithms.

- bool **preserve\_control**

<i>Default</i>	false
<i>Setter</i>	set_preserve_control(value)
<i>Getter</i>	get_preserve_control()

If `true`, displays control character.

---

- String **text**

<i>Default</i>	""
<i>Setter</i>	set_text(value)
<i>Getter</i>	get_text()

Text string.

### 5.14.8 Method Descriptions

- void **add\_sstring** ( *TLShapedString* text )

Appends shaped string.

---

- void **add\_text** ( String text )

Appends plain text string.

---

- void **add\_utf16** ( PoolByteArray text )
- 

- void **add\_utf32** ( PoolByteArray text )
- 

- void **add\_utf8** ( PoolByteArray text )
- 

- Array **break\_jst** ( ) const
- 

- Array **break\_lines** ( float width, int flags ) const

Breaks text into lines that fit within a specified width.

Returns Array of line boundaries.

---

- Array **break\_words** ( ) const

Breaks text into words.

Returns Array of word boundaries.

---

- int **char\_count** ( ) const

Returns number of characters in the string.

---



- int **clusters** ( ) const

Returns number of grapheme clusters, clusters are indexed in visual order.

---

- void **copy\_properties** ( *TLShapedString* source )
- 

- void **draw** ( RID canvas\_item, Vector2 position, Color modulate )

Draws a string.

---

- void **draw\_as\_hex** ( RID canvas\_item, Vector2 position, Color modulate, bool draw\_brk\_ops, bool draw\_jst\_ops )

DEBUG : Draws a string using “hexbox” fallback font.

---

- Vector2 **draw\_cluster** ( RID canvas\_item, Vector2 position, int index, Color modulate )

Draws single grapheme cluster. Returns advance.

---

- void **draw\_dbg** ( RID canvas\_item, Vector2 position, Color modulate, bool draw\_brk\_ops, bool draw\_jst\_ops )

DEBUG : Draws a string with additional debug information.

---

- void **draw\_logical\_as\_hex** ( RID canvas\_item, Vector2 position, Color modulate, bool draw\_brk\_ops, bool draw\_jst\_ops )

DEBUG : Draws logical character codes of the string with additional debug information.

---

- bool **empty** ( ) const

Returns `true` if the string is empty.

---

- float **extend\_to\_width** ( float width, int flags )

Increase text width to the specified. Returns new line width.

---

- float **get\_ascent** ( ) const

Returns ascent of the line.

---

- *TextDirection* **get\_char\_direction** ( int position ) const

Return writing direction of a character writing direction.

---

- float **get\_cluster\_ascent** ( int index ) const

Returns cluster ascent.

---

- String **get\_cluster\_debug\_info** ( int index ) const
-

- 
- float **get\_cluster\_descent** ( int index ) const

Returns cluster descent.

---

- int **get\_cluster\_end** ( int index ) const

Returns last character position corresponding cluster.

---

- *TLFontFace* **get\_cluster\_face** ( int position ) const

Returns font face of the cluster.

---

- float **get\_cluster\_face\_size** ( int position ) const

Returns font size of the cluster. For non-attributed string it's always equal to base size.

---

- int **get\_cluster\_glyph** ( int index, int glyph ) const

Returns glyph ID.

---

- Vector2 **get\_cluster\_glyph\_advance** ( int index, int glyph ) const

Returns glyph advance.

---

- Vector2 **get\_cluster\_glyph\_offset** ( int index, int glyph ) const

Returns glyph offset.

---

- int **get\_cluster\_glyphs** ( int index ) const

Returns number of glyphs in cluster.

---

- float **get\_cluster\_height** ( int index ) const

Returns cluster height.

---

- int **get\_cluster\_index** ( int position ) const

Returns cluster index corresponding to a specific character position in string.

---

- float **get\_cluster\_leading\_edge** ( int index ) const

Returns cluster leading edge offset in pixels.

---

- Rect2 **get\_cluster\_rect** ( int index ) const

Returns cluster bounding rectangle.

---

- `int get_cluster_start ( int index ) const`

Returns first character position corresponding cluster.

---

- `float get_cluster_trailing_edge ( int index ) const`

Returns cluster trailing edge offset in pixels.

---

- `float get_cluster_width ( int index ) const`

Returns cluster width.

---

- `Array get_cursor_positions ( int position, int primary_dir ) const`

Returns an Array of `float` (up to two elements) offsets corresponding to the strong and weak cursor, at the specified character position.

---

- `float get_descent ( ) const`

Returns descent of the line.

---

- `float get_height ( ) const`

Returns height of the line.

---

- `Array get_highlight_shapes ( int start, int end ) const`

Returns an Array of `Rect2` enclosing the selection/highlight in the specified range.

---

- `int get_para_direction ( ) const`

Returns shaped string paragraph direction.

---

- `PoolByteArray get_utf16 ( ) const`

Returns raw text string in UTF-16 encoding.

---

- `PoolByteArray get_utf32 ( ) const`

Returns raw text string in UTF-32 encoding.

---

- `PoolByteArray get_utf8 ( ) const`

Returns raw text string in UTF-8 encoding.

---

- `float get_width ( ) const`

Returns width of the line.

---

- `int hit_test ( float position ) const`

Returns a cursor position corresponding to the specified pixel offset.

---

- int **hit\_test\_cluster** ( float position ) const

Returns a cluster index corresponding to the specified pixel offset.

---

- bool **is\_valid** ( ) const

Returns `true` if the string is shaped successfully.

---

- int **length** ( ) const

Returns number of UTF-16 codepoints in the string.

---

- int **next\_safe\_bound** ( int position ) const

Returns next whole character position in the string.

---

- int **pos\_u16\_to\_wcs** ( int position ) const

Returns character position (Characters)

---

- int **pos\_wcs\_to\_u16** ( int position ) const

Retruns character position (UTF-16 codepoints)

---

- int **prev\_safe\_bound** ( int position ) const

Returns previous whole character position in the string.

---

- void **replace\_sstring** ( int start, int end, *TLShapedString* text )

Replaces substring with contents of another shaped string.

---

- void **replace\_text** ( int start, int end, String text )

Replaces substring with text.

---

- void **replace\_utf16** ( int start, int end, PoolByteArray text )

Replaces substring with contents of the raw UTF-16 encoded string.

---

- void **replace\_utf32** ( int start, int end, PoolByteArray text )

Replaces substring with contents of the raw UTF-32 encoded string.

---

- void **replace\_utf8** ( int start, int end, PoolByteArray text )

Replaces substring with contents of the raw UTF-8 encoded string.

---

- void **set\_utf16** ( PoolByteArray data )

Sets text to the contents of the raw UTF-16 encoded string.

---

- void **set\_utf32** ( PoolByteArray data )

Sets text to the contents of the raw UTF-32 encoded string.

---

- void **set\_utf8** ( PoolByteArray data )

Sets text to the contents of the raw UTF-8 encoded string.

---

- bool **shape** ( )

Shapes string and returns `true` if the string is shaped successfully.

---

- *TLShapedString* **substr** ( int start, int end, int trim ) const

Returns part of the shaped string from the position `start` to `end`, trims it according to `trim` parameter.

---