

# GenServer - a cheat sheet

last version: <https://elixir-lang.org/getting-started/mix-otp/cheat-sheet.pdf>

source: <https://github.com/elixir-lang/elixir-lang.github.com>; license: CC:BY-SA; Copyright: check the source.

reference: <https://hexdocs.pm/elixir/GenServer.html>

initialization: `.start` → **init/1**

**client**

```
def start_link(opts \\ []) do
  GenServer.start_link(__MODULE__, match_this, opts)
end
```

**callback**

```
def init(match_this) do
  # process input and compute result
  result
end
```

**^result =**

```
{:ok, state}
{:ok, state, then_what}

{:stop, reason}
:ignore
```

**returns**

```
{:ok, pid}
```

**stop reasons**

- `:normal` doesn't log, doesn't break links
- `:shutdown`, `{:shutdown, _}` doesn't log, breaks links
- anything else logs, breaks links.

**applies globally**

**^reason =**

```
:normal
:shutdown
{:shutdown, _}
_
```

termination: `.stop` → **terminate/2**

**client**

```
def stop(pid, reason \\ :normal,
         timeout \\ :infinity) do
  GenServer.stop(pid, reason, timeout)
end
```

**callback**

```
def terminate(reason, state) do
  # perform cleanup
  # result will not be used
end
```

**returns**

```
:ok
```

**:stop**

terminate/2 is also called when `:stop` is returned and in case of errors, when `Process.flag(:trap_exit)` is true.

asynchronous operation: `.cast` → **handle\_cast/2**

**client**

```
def your_api_async_op(pid, args) do
  GenServer.cast(pid, match_this)
end
```

**callback**

```
def handle_cast(match_this, state) do
  # process input and compute result
  result
end
```

**^result =**

```
{:noreply, state}
{:noreply, state, then_what}

{:stop, reason, state}
```

**returns**

```
:ok
```

**applies globally**

**^then\_what =**

```
timeout_milliseconds
:hibernate
{:continue, value}
```

synchronous operation: `.call` → **handle\_call/3**

client

```
def your_api_sync_op(pid, args) do
  GenServer.call(pid, match_this)
end
```

callback

```
def handle_call(match_this, from, state) do
  # process input and compute result
  result
end
```

`^result =`

```
{:reply, reply, state}
{:reply, reply, state, then_what}

{:noreply, state}
{:noreply, state, then_what}

{:stop, reason, reply, state}
```

returns

waits for callback, receives reply if result matches `{:reply, reply, ...}` or `{:stop, _, reply, _}`.

`^reply =`

user defined

handling messages: → **handle\_info/2**

client

```
def handle_info(match_this, state) do
  # process input and compute result
  result
end
```

`^result =`

```
{:noreply, state}
{:noreply, state, then_what}

{:stop, reason, state}
```

`{:continue, match_this}` → **handle\_continue/2**

client

```
def handle_continue(match_this, state) do
  # process input and compute result
  result
end
```

`^result =`

```
{:noreply, state}
{:noreply, state, then_what}

{:stop, reason, state}
```

footnotes

- Use `@impl true` before each definition to guarantee it matches the equivalent GenServer callback.
- Callbacks not listed here are: `code_change/3` and `format_status/2`.