

GenServer - a cheat sheet

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

— 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
```

returns

```
{:ok, pid}
:ignore
{:error, term}
```

callback

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

stop reasons

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

`^result =`

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

{:stop, reason}
:ignore
```

`^reason =`

applies globally

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

termination: `.stop` → `terminate/2`

client

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

returns

```
:ok
```

callback

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

`: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
```

returns

```
:ok
```

callback

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

`:stop`

`^result =`

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

{:stop, reason, state}
```

`^then_what =`

applies globally

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

synchronous operation: `.call` → `handle_call/3`

client

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

returns

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

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}
```

`^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}
```

`^then_what = {: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`.
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