Formant Agent SDK Reference

Formant

Oct 30, 2024

CONTENTS:

This document outlines the usage for each method of the Formant Agent SDK.

class formant.sdk.agent.v1.**Client**(*agent_url='unix:///var/lib/formant/agent.sock'*, *enable_logging=True*, *ignore_throttled=False*, *ignore_unavailable=False*, *local_dev=False*, *thread_pool_size=10*)

A client for interacting with the Formant agent. Automatically handles connection and reconnection to the agent. There are methods for:

- Ingesting telemetry datapoints
- Creating events
- Handling commands
- Ingesting transform frames
- Reading application configuration
- Handling teleop control datapoints

Parameters

- **agent_url** – The address of the Formant agent API.
- **enable_logging** – If `True`, this client will log some information to `stdout`.
- **ignore_throttled** – If `True`, `telemetry datapoint throttle` errors will not raise Exceptions. Throttled datapoints are still valid for teleoperation.
- **ignore_unavailable** – If `True`, `Formant agent unavailable` errors will not raise Exceptions.

get_agent_id()

Gets the Device ID for this device.

Return type
str

post_text(*stream*, *value*, *tags=None*, *timestamp=None*)

Post a text datapoint to a stream.

Parameters

- **stream** (`str`) – The name of the Formant stream to post the datapoint on
- **value** (`str`) – The text datapoint value
- **tags** (`Optional[Dict[str, str]]`) – Tags to include on the posted datapoint
- **timestamp** (`Optional[int]`) – Unix timestamp in milliseconds for the posted datapoint. Uses the current time by default

Return type
None

```
from formant.sdk.agent.v1 import Client

fclient = Client()
fclient.post_text(
    "example.text",
    "Processed 9 items"
)
```

post_json(*stream*, *value*, *tags=None*, *timestamp=None*)

Post a JSON datapoint to a telemetry stream.

Parameters

- **stream** (str) – The name of the Formant stream to post the datapoint on
- **value** (str) – The encoded JSON datapoint value
- **tags** (Optional[Dict[str, str]]) – Tags to include on the posted datapoint
- **timestamp** (Optional[int]) – Unix timestamp in milliseconds for the posted datapoint. Uses the current time by default

Return type
None

post_numeric(*stream*, *value*, *tags=None*, *timestamp=None*)

Post a numeric datapoint to a telemetry stream.

Parameters

- **stream** (str) – The name of the Formant stream to post the datapoint on
- **value** (Union[float, int]) – The numeric datapoint value
- **tags** (Optional[Dict[str, str]]) – Tags to include on the posted datapoint
- **timestamp** (Optional[int]) – Unix timestamp in milliseconds for the posted datapoint. Uses the current time by default

Return type
None

post_numericset(*stream*, *numerics_dict*, *tags=None*, *timestamp=None*)

Post a numeric set datapoint to a telemetry stream. Numeric sets are collections of related numeric datapoints.

Parameters

- **stream** (str) – The name of the Formant stream to post the datapoint on
- **numerics_dict** (Dict[str, Tuple[Union[float, int], Optional[str]]]) – The numeric set datapoint value, a dictionary mapping names to (numeric value, units) tuples.
- **tags** (Optional[Dict[str, str]]) – Tags to include on the posted datapoint
- **timestamp** (Optional[int]) – Unix timestamp in milliseconds for the posted datapoint. Uses the current time by default

Return type
None

```
from formant.sdk.agent.v1 import Client

fclient = Client()
fclient.post_numericset(
    "example.numericset2",
    {
        "frequency": (998, "Hz"),
        "usage": (30, "percent"),
        "warp factor": (6.0, None),
```

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```
    },
)
```

post_image(*stream*, *value=None*, *url=None*, *content_type='image/jpg'*, *tags=None*, *timestamp=None*)

Post an image datapoint to a telemetry stream.

Parameters

- **stream** (str) – The name of the Formant stream to post the datapoint on
- **value** (Optional[bytes]) – The datapoint value: raw bytes of an encoded image or frame
- **url** (Optional[str]) – The datapoint url: path to local file or valid remote URL for remote files
- **content_type** (('image/jpg', 'image/png', 'video/h264')) – The format of the encoded image or frame. Defaults to image/jpg.
- **tags** (Optional[Dict[str, str]]) – Tags to include on the posted datapoint
- **timestamp** (Optional[int]) – Unix timestamp in milliseconds for the posted datapoint. Uses the current time by default

Return type
None

post_bitset(*stream*, *bitset_dict*, *tags=None*, *timestamp=None*)

Post a bitset datapoint to a telemetry stream. A bitset is a collection of related boolean states.

Parameters

- **stream** (str) – The name of the Formant stream to post the datapoint on
- **bitset_dict** (Dict[str, bool]) – The datapoint value, a dictionary mapping names to booleans
- **tags** (Optional[Dict[str, str]]) – Tags to include on the posted datapoint
- **timestamp** (Optional[int]) – Unix timestamp in milliseconds for the posted datapoint. Uses the current time by default

Return type
None

```
from formant.sdk.agent.v1 import Client

fclient = Client()
fclient.post_bitset(
    "example.bitset",
    {
        "standing": False,
        "walking": False,
        "sitting": True
    }
)
```

post_geolocation(*stream*, *latitude*, *longitude*, *tags=None*, *timestamp=None*, *altitude=None*, *orientation=None*)

Post a geolocation datapoint to a telemetry stream.

Parameters

- **stream** (str) – The name of the Formant stream to post the datapoint on
- **latitude** (Union[float, int]) – The datapoint value's latitude
- **longitude** (Union[float, int]) – The datapoint value's longitude
- **tags** (Optional[Dict[str, str]]) – Tags to include on the posted datapoint
- **timestamp** (Optional[int]) – Unix timestamp in milliseconds for the posted datapoint. Uses the current time by default

Return type
None

post_battery(*stream*, *percentage*, *voltage=None*, *current=None*, *charge=None*, *tags=None*, *timestamp=None*)

Post a battery datapoint to a telemetry stream. Only percentage is required.

Parameters

- **stream** (str) – The name of the Formant stream to post the datapoint on
- **percentage** (Union[int, float]) – The battery charge percentage
- **voltage** (Union[float, int, None]) – The battery voltage
- **current** (Union[float, int, None]) – The battery current
- **charge** (Union[float, int, None]) – The battery charge
- **tags** (Optional[Dict[str, str]]) – Tags to include on the posted datapoint
- **timestamp** (Optional[int]) – Unix timestamp in milliseconds for the posted datapoint. Uses the current time by default

Return type
None

post_file(*stream*, *url=None*, *filename=None*, *tags=None*, *timestamp=None*)

Post a file to a telemetry stream.

Parameters

- **stream** (str) – The name of the Formant stream to post the file on
- **url** (Optional[str]) – The file url: path to local file or valid remote URL for remote files
- **filename** (Optional[str]) – The file name: name displayed inside Formant module
- **tags** (Optional[Dict[str, str]]) – Tags to include on the posted file
- **timestamp** (Optional[int]) – Unix timestamp in milliseconds for the posted file. Uses the current time by default

Return type
None

```
from formant.sdk.agent.v1 import Client

fclient = Client()
fclient.post_file(
    "example.file",
    /home/user/Desktop/data/planets.csv,
```

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```
    planets.csv,
)
```

prepare_text(*stream*, *value*, *tags=None*, *timestamp=None*)

Prepare a text datapoint without posting it.

Parameters

- **stream** (str) – The name of the Formant stream for the datapoint
- **value** (str) – The text datapoint value
- **tags** (Optional[Dict[str, str]]) – Tags for the datapoint
- **timestamp** (Optional[int]) – Unix timestamp in milliseconds for the datapoint. Uses the current time by default

Return type
datapoint_pb2.Datapoint

prepare_json(*stream*, *value*, *tags=None*, *timestamp=None*)

Prepare a JSON datapoint without posting it.

Parameters

- **stream** – (str) The name of the Formant stream for the datapoint
- **value** – (str) The encoded JSON datapoint value
- **tags** – (Optional[Dict[str, str]]) Tags for the datapoint
- **timestamp** – (Optional[int]) Unix timestamp in milliseconds for the datapoint. Uses the current time by default

Return type
datapoint_pb2.Datapoint

prepare_numeric(*stream*, *value*, *tags=None*, *timestamp=None*)

Prepare a numeric datapoint without posting it.

Parameters

- **stream** – (str) The name of the Formant stream for the datapoint
- **value** – (Union[float, int]) The numeric datapoint value
- **tags** – (Optional[Dict[str, str]]) Tags for the datapoint
- **timestamp** – (Optional[int]) Unix timestamp in milliseconds for the datapoint. Uses the current time by default

Return type
datapoint_pb2.Datapoint

prepare_numericset(*stream*, *numerics_dict*, *tags=None*, *timestamp=None*)

Prepare a numeric set datapoint without posting it.

Parameters

- **stream** – (str) The name of the Formant stream for the datapoint
- **numerics_dict** – (Dict[str, Tuple[Union[float, int], Optional[str]]]) The numeric set datapoint value, a dictionary mapping names to (numeric value, units) tuples.

- **tags** – (Optional[Dict[str, str]]) Tags for the datapoint
- **timestamp** – (Optional[int]) Unix timestamp in milliseconds for the datapoint. Uses the current time by default

Return type
The prepared numeric set datapoint

Raises
`TypeError: value v for key k in numericset must have length of 2`

prepare_image(*stream*, *value=None*, *url=None*, *content_type='image/jpg'*, *tags=None*, *timestamp=None*)

Prepare an image datapoint without posting it.

Parameters

- **stream** – (str) The name of the Formant stream for the datapoint
- **value** – (Optional[bytes]) The datapoint value: raw bytes of an encoded image or frame
- **url** – (Optional[str]) The datapoint url: path to a local file or valid remote URL for remote files
- **content_type** – (Literal["image/jpg", "image/png", "video/h264"]) The format of the encoded image or frame. Defaults to `"image/jpg"`.
- **tags** – (Optional[Dict[str, str]]) Tags for the datapoint
- **timestamp** – (Optional[int]) Unix timestamp in milliseconds for the datapoint. Uses the current time by default

Return type
datapoint_pb2.Datapoint

Raises
`InvalidArgument: One of [url, value] must be used.`

prepare_bitset(*stream*, *bitset_dict*, *tags=None*, *timestamp=None*)

Prepare a bitset datapoint without posting it.

Parameters

- **stream** – (str) The name of the Formant stream for the datapoint
- **bitset_dict** – (Dict[str, bool]) The datapoint value, a dictionary mapping names to booleans
- **tags** – (Optional[Dict[str, str]]) Tags for the datapoint
- **timestamp** – (Optional[int]) Unix timestamp in milliseconds for the datapoint. Uses the current time by default

Return type
datapoint_pb2.Datapoint

prepare_geolocation(*stream*, *latitude*, *longitude*, *tags=None*, *timestamp=None*, *altitude=None*, *orientation=None*)

Prepare a geolocation datapoint without posting it.

Parameters

- **stream** – (str) The name of the Formant stream for the datapoint
- **latitude** – (Union[float, int]) The datapoint value's latitude
- **longitude** – (Union[float, int]) The datapoint value's longitude

- **tags** – (Optional[Dict[str, str]]) Tags for the datapoint
- **timestamp** – (Optional[int]) Unix timestamp in milliseconds for the datapoint. Uses the current time by default
- **altitude** – (Union[float, int]) The altitude value (optional)
- **orientation** – (Union[float, int]) The orientation value (optional)

Returns
The prepared geolocation datapoint

Return type
datapoint_pb2.Datapoint

prepare_battery(*stream*, *percentage*, *voltage=None*, *current=None*, *charge=None*, *tags=None*, *timestamp=None*)

Prepare a battery datapoint without posting it.

Parameters

- **stream** – (str) The name of the Formant stream for the datapoint
- **percentage** – (Union[int, float]) The battery charge percentage
- **voltage** – (Optional[Union[int, float]]) The battery voltage (optional)
- **current** – (Optional[Union[int, float]]) The battery current (optional)
- **charge** – (Optional[Union[int, float]]) The battery charge (optional)
- **tags** – (Optional[Dict[str, str]]) Tags for the datapoint
- **timestamp** – (Optional[int]) Unix timestamp in milliseconds for the datapoint. Uses the current time by default

Returns
The prepared battery datapoint

Return type
datapoint_pb2.Datapoint

prepare_file(*stream*, *url=None*, *filename=None*, *tags=None*, *timestamp=None*)

Prepare a file datapoint without posting it.

Parameters

- **stream** – (str) The name of the Formant stream for the datapoint
- **url** – (str) The file url: path to a local file or valid remote URL for remote files
- **filename** – (Optional[str]) The file name: name displayed inside Formant module
- **tags** – (Optional[Dict[str, str]]) Tags for the datapoint
- **timestamp** – (Optional[int]) Unix timestamp in milliseconds for the datapoint. Uses the current time by default

Returns
The prepared file datapoint

Return type
datapoint_pb2.Datapoint

`register_telemetry_listener_callback`(*f*, *stream_filter=None*)

Datapoints posted to the Formant agent whose "stream" value matches an element of the given stream filter will be streamed into the provided callback. If no stream filter is provided, datapoints from all streams will be received.

Parameters

- **f** – A callback that will be called when a datapoint is posted to the Formant agent
- **stream_filter** – A list of stream names. The provided callback is only called for datapoints whose stream name is in this list

`unregister_telemetry_listener_callback`(*f*)

Unregisters previously registered telemetry loopback callback.

Parameters
f – The telemetry loopback callback to be unregistered

`set_base_frame_id`(*base_reference_frame*)

Sets the base reference frame for tf tree ingestion.

Parameters
base_reference_frame – The base reference frame for the tf tree.

Return type
None

`post_transform_frame`(*parent_frame*, *child_frame*, *tx*, *ty*, *tz*, *rx*, *ry*, *rz*, *rw*)

Adds a transform frame, used to position datapoints in 3D space.

Parameters

- **parent_frame** (`str`) – The parent frame of the posted transform
- **child_frame** (`str`) – The child frame of the posted transform
- **tx** (`Union[int, float]`) – x-translation
- **ty** (`Union[int, float]`) – y-translation
- **tz** (`Union[int, float]`) – z-translation
- **rx** (`Union[int, float]`) – x-rotation (quaternion)
- **ry** (`Union[int, float]`) – y-rotation (quaternion)
- **rz** (`Union[int, float]`) – z-rotation (quaternion)
- **rw** (`Union[int, float]`) – w-rotation (quaternion)

Return type
None

`create_event`(*message*, *tags=None*, *timestamp=None*, *end_timestamp=None*, *notify=False*, *severity='info'*)

Creates and ingests an event.

Parameters

- **message** (`str`) – The text payload of the event
- **tags** (`Optional[Dict[str, str]]`) – Tags to include on the event
- **timestamp** (`Optional[int]`) – Unix starting timestamp for the event. Uses the current time by default

- **end_timestamp** (Optional[int]) – Unix ending timestamp for the event. Must be greater than timestamp. If end_timestamp is supplied, the event will span a length of time
- **notify** (bool) – If True, the created event will trigger a Formant notification
- **severity** (('info', 'warning', 'critical', 'error')) – The severity level of the event

Return type
None

```
from formant.sdk.agent.v1 import Client

fclient = Client()
fclient.create_event(
    "Confinement beam to warp frequency 0.4e17 hz",
    tags={"Region": "North"},
    notify=True,
    severity="warning"
)
```

get_command_request(*command_filter=None*)

If there is a command request in the agent's queue whose command value matches an element of the given command filter, takes and returns the command request. Otherwise, returns None if there are no matching command requests in the agent's queue.

Parameters
command_filter (Optional[List[str]]) – A list of command names. This method only returns commands whose names are in this list.

Return type
CommandRequest, None

send_command_response(*request_id*, *success*, *datapoint=None*)

Sends a command response for an identified command request to Formant. Returns an error if there was a problem sending the command response.

Parameters

- **request_id** (str) – The ID of the command request to which this method responds
- **success** (bool) – Whether the command was successfully executed
- **datapoint** (Optional[Datapoint]) – A datapoint related to the command. Can attach a datapoint to a command response. E.g., if a command fails, can ingest a text datapoint with an error message related to the failure of the command.

Return type
None

register_command_request_callback(*f*, *command_filter=None*)

Command requests issued to the agent whose command value matches an element of the given command filter will be streamed into the provided callback. If no command filter is provided, all command requests will be handled.

Parameters

- **f** (Callable[[CommandRequest], None]) – A callback that will be executed on command requests as they are received by the Formant agent.

- **command_filter** (Optional[List[str]]) – A list of command names. The provided callback is only executed on commands whose names are in this list

Return type
None

unregister_command_request_callback(*f*)

Unregisters previously registered command request callback.

Parameters
f (Callable[[CommandRequest], None]) – The command request callback to be unregistered

Return type
None

register_teleop_callback(*f*, *stream_filter=None*)

Control datapoints received from teleop whose stream value matches an element of the given stream filter will be streamed into the provided callback. If no stream filter is provided, control datapoints from all streams will be received.

Parameters

- **f** (Callable[[ControlDatapoint], None]) – A callback that will be executed on teleop control datapoints as they are received by the Formant agent
- **stream_filter** (Optional[List[str]]) – A list of stream names. The provided callback is only exectued on control datapoints whose names are in this list

Return type
None

unregister_teleop_callback(*f*)

Unregisters previously registered teleop callback.

Parameters
f (Callable[[ControlDatapoint], None]) – The teleop callback to be unregistered

Return type
None

get_teleop_info()

Returns current information about teleop connection count.

Return type
GetTeleopInfoResponse

register_teleop_heartbeat_callback(*f*)

The provided callback will be called once each time a heartbeat is received over Formant teleop. Heartbeats are streamed from the operator machine at 20Hz on a UDP-like channel. This method can be used to quickly detect teleop disconnections.

Parameters
f – A callback that will be called when a heartbeat is received.

Return type
None

unregister_teleop_heartbeat_callback(*f*)

Unregisters previously registered teleop heartbeat callback.

Parameters
f – The teleop heartbeat callback to be unregistered

Return type
None

send_on_custom_data_channel(*channel_name*, *payload*)

Sends data on custom data channel.

Parameters

- **channel_name** – (str) The name of the channel over which to send data
- **payload** – (bytes) The data payload to send.

Return type
None

register_custom_data_channel_message_callback(*f*, *channel_name_filter=None*)

Registers a callback on data presence on the specified data channel.

Parameters

- **f** – A callback that will be called with messages received on the specified custom data channel.
- **channel_name_filter** – An optional allow list of custom channel names for this callback.

Return type
None

unregister_custom_data_channel_message_callback(*f*)

Unregisters previously registered custom data channel callback.

Parameters
f – The custom data channel message callback to be unregistered.

Return type
None

custom_data_channel_request_handler(*channel_name*)

Registers a handler for requests sent by RequestDataChannel instances (part of the Formant toolkit). See: https://github.com/FormantIO/toolkit/tree/master/examples/request-response for an example.

Parameters
channel_name – The name of the custom data channel to listen on.

Return type
GetCustomDataChannelMessageStreamResponse

```
from formant.sdk.agent.v1 import Client

fclient = Client()

@fclient.custom_data_channel_request_handler("my_channel")
def handler(request_data):
    # Do something with request_data string
    print(json.loads(request_data))
```

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```
    # Return any string response
    return json.dumps({"message": "Hello world!"})
```

custom_data_channel_binary_request_handler(*channel_name*, *new_thread=False*)

Parameters
channel_name – The name of the custom data channel to listen on.

```
from formant.sdk.agent.v1 import Client

fclient = Client()

@fclient.custom_data_channel_request_handler("my_channel")
def handler(request_data):
    # Do something with request_data bytes
    print(request_data.decode("utf-8"))

    # Return any bytes response
    return b"Hello."
```

get_app_config(*key*, **args*)

Returns the value for the given key that was set in Formant application configuration for this device, or returns the given default value.

Parameters

- **key** (str) – The application configuration key
- **args** (Any) – (One additional argument) The default value to return if the key is not found.

Raises
TypeError: Function takes at most two args: (key: str, default: Any)

Return type
Optional[str]

get_config_blob_data()

Returns the blob data defined in the device configuration.

Return type
str

get_buffer_metadata()

Returns the current WebRTC buffer statistics.

Return type
agent_pb2.GetBufferMetadata

register_config_update_callback(*f*)

Adds a function to the list of callbacks that are executed by the client when this device receives updated configuration from Formant.

Parameters
f (Callable) – The configuration update callback to be registered.

Return type
None

`unregister_config_update_callback`(*f*)

Removes a function from the list of callbacks that are executed by the client when this device receives updated configuration from Formant.

Parameters
f (Callable) – The configuration update callback to be unregistered.

Return type
None

`call_cloud`(*endpoint*, *method*, *body*, *headers*, *require_formant_auth*, *buffer_call*, *is_retryable*, *retryable_status_codes=[]*)

Allows the user to make an arbitrary Formant API call with device authentication.

Parameters

- **endpoint** – (str) The endpoint to call.
- **method** – (str) The HTTP method to use.
- **body** – (str) The body of the request.
- **headers** – (Dict[str, str])The headers to use.
- **require_formant_auth** – (bool) Whether or not to use device authentication. If `True`, then device authentication is automatically injected into the request.
- **buffer_call** – (bool) Whether or not to buffer the call. If `True`, then the call is buffered and retried. If a call is buffered, the response is not returned.
- **is_retryable** – (bool) (`buffer_call=True` only) Whether or not to retry the call.
- **retryable_status_codes** – (bool) (`buffer_call=True` only) The status codes to retry on.

`create_selection_intervention_request`(*title*, *instruction*, *options*, *hint*, *url=None*, *content_type='image/jpg'*, *timestamp=None*, *severity='info'*)

Creates an intervention request based on type `selection`. Takes an image url, options and an integer with an optional addition of instructions, and title.

Parameters

- **title** – (str) The name of the intervention
- **instruction** – (str) The instructions detailing how to resolve the intervention
- **options** – (List[str]) The list with options to select from
- **hint** – (int) The index of the suspected correct answer
- **url** – (str) The path to local file or valid remote URL for remote files
- **content_type** – (Literal[“image/jpg”, “image/png”]) The format of the encoded image or frame. Defaults to `"image/jpg"`
- **timestamp** – (Optional[int]) Unix timestamp in milliseconds for the posted datapoint. Uses the current time by default
- **severity** – (Literal[“info”, “warning”, “critical”, “error”]) The severity level of the event

Return type
InterventionRequest

```
from formant.sdk.agent.v1 import Client

fclient = Client()
fclient.create_selection_intervention_request(
    "Which fruit is best?",
    "Select the best grape",
    ["fruit_1", "fruit_2", "fruit_3"],
    hint=1,
    url=/home/my_user/data/test-image.jpeg
    severity=critical
)
```

create_labeling_intervention_request(*title*, *instruction*, *labels*, *hint=None*, *url=None*, *content_type='image/jpg'*, *timestamp=None*, *severity='info'*)

Creates an intervention request based on type "labeling".

Parameters

- **title** – (str) The name of the intervention
- **instruction** – (str) The instructions detailing how to resolve the intervention
- **labels** – (Dict[str, str]) An Array of labels
- **hint** – (Optional[List[intervention_pb2.LabeledPolygon]]) An array of label polygons, X and Y coordinates with a label
- **url** – (str) The path to local file or valid remote URL for remote files
- **content_type** – (Literal["image/jpg", "image/png"]) The format of the encoded image or frame. Defaults to `"image/jpg"`.
- **timestamp** – (Optional[int]) Unix timestamp in milliseconds for the posted datapoint. Uses the current time by default
- **severity** – (Literal["info", "warning", "critical", "error"]) The severity level of the event

Return type
intervention_pb2.InterventionRequest

Each `label` in `labels` defined as:

```
Label = {
        value = string;
        string display_name = string;
        }
```

Hint is an array of "LabeledPolygon", defined as:

```
hint = {
    List of vertex,
    List of labels
}
```

where each vertex is defined as:

```
vertex = {
    x = float,
```

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```
    y = float
}
```

get_intervention_response(*request_id*)

Receives request ID, and returns a response.

Parameters

- **request_id** – (str) The ID of the intervention request to which this method responds
- **timestamp** – Unix timestamp in milliseconds for the posted datapoint. Uses the current time by default.

Return type

agent_pb2.GetInterventionResponse

```
from formant.sdk.agent.v1 import Client

fclient = Client()
request = fclient.create_selection_intervention_request(
    title="",
    instruction="instruction",
    options=["option1", "option2", "option3"],
    hint=0,
    url="/home/formantuser/Downloads/image.png",
)
fclient.handle_intervention_response(request.id)
```

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