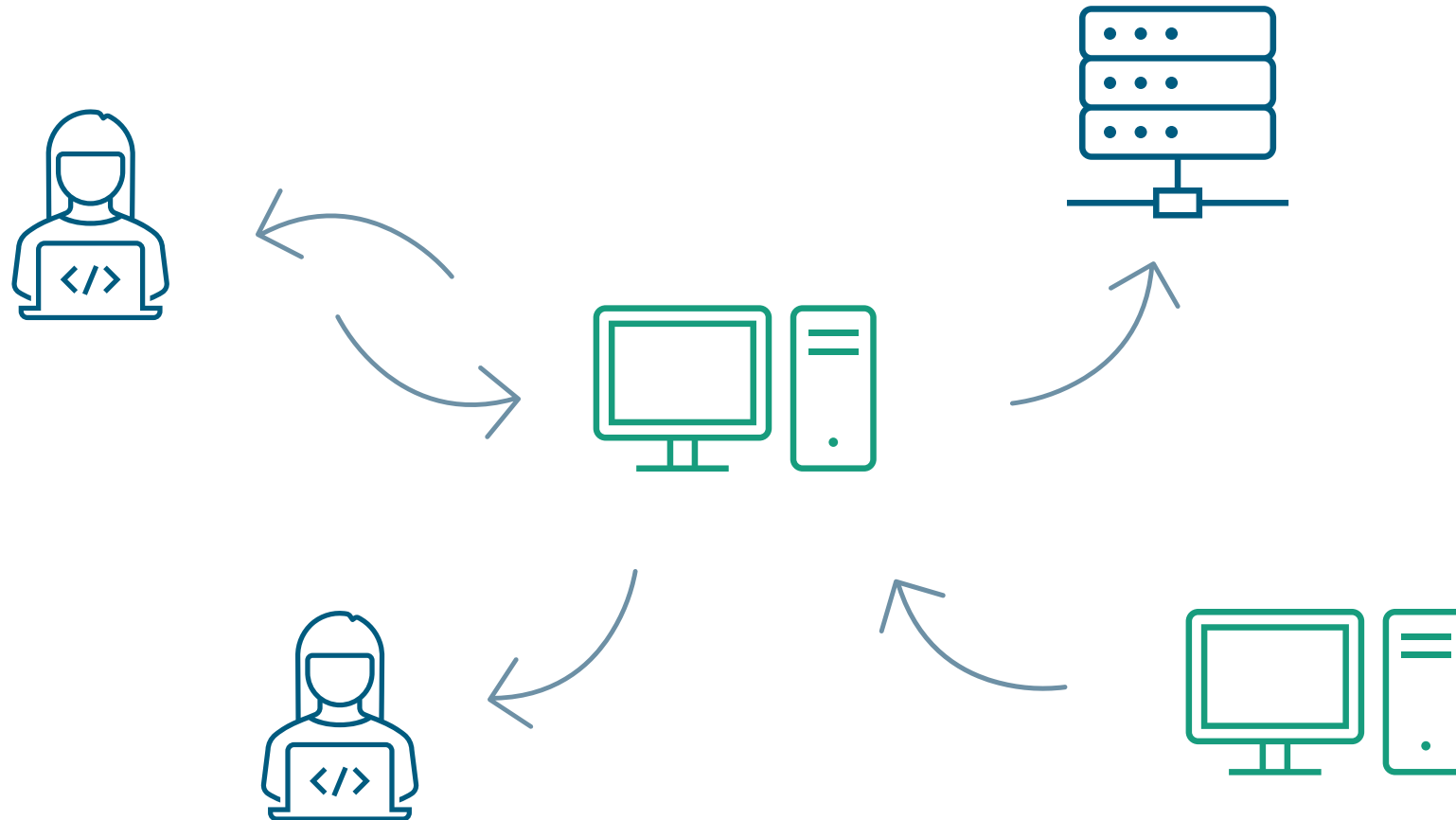
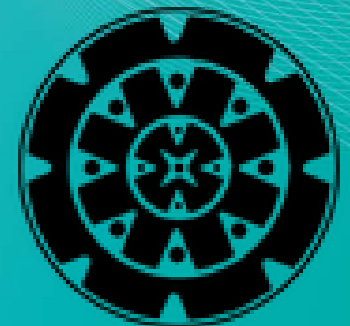




libjapi: An Open Source C Library for Seamless JSON Messaging Across Platforms

Katja Vornberger, 06.03.2024, deRSE conference, Würzburg



Quick Facts



Abstract and reliable

- C library
- Used for years in several projects

Simple integration

- Minimal dependencies
- Reuse existing functions

Configurable API

- Big and small use cases

MIT license

- Free to use
- Open to contributions

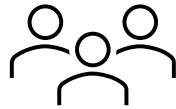
Inside libjapi

Features

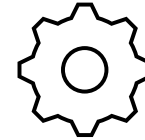


|0|0 → „A“
|0|0

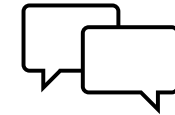
**Abstracts string
handling**



**Supports multiple
parallel users**



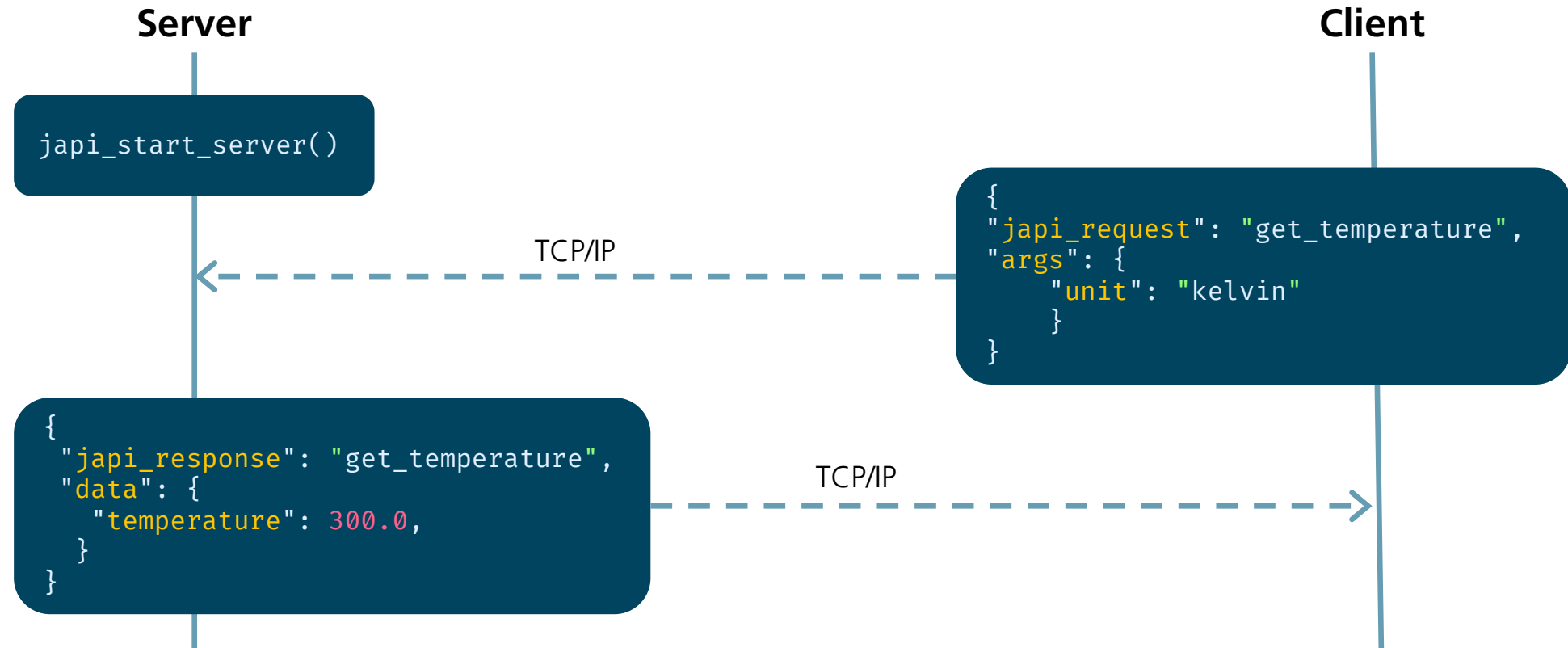
**Highly customizable
behaviour at the
server side**



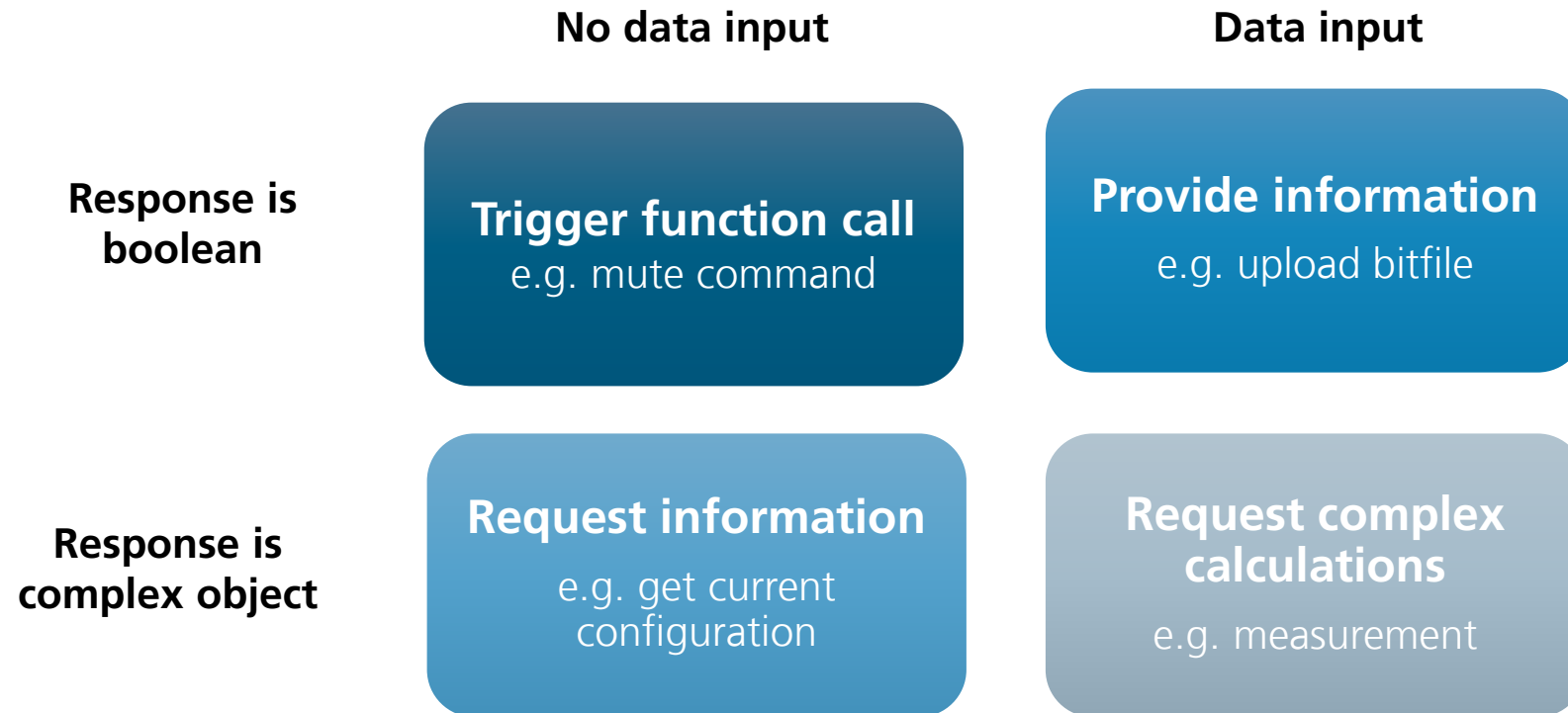
**Clients can be any
other language or
framework**

Inside libjapi

Functionality



Classes of Use Cases



Inside libjapi

Push Services



Server

Client

```
japi_start_server()
```

```
{  
  "japi_request": "japi_pushsrv_subscribe",  
  "args": {  
    "service": "push_temperature"  
  }  
}
```

```
{  
  "japi_response": "japi_pushsrv_subscribe",  
  "data": {  
    "suervice": "push_temperature",  
    "success": true  
  }  
}
```

```
{  
  "japi_pushsrv": "push_temperature",  
  "data": {  
    "temperature": 31.9  
  }  
}
```

Getting Started...



```
#include "japi.h"

int main(int argc, char *argv[])
{
    int ret;
    japi_context *ctx = japi_init(&temperature_sensor);

    japi_register_request(ctx, "get_temperature", &get_temperature);
    ret = japi_start_server(ctx, 8643);
    /* Keeps running until interrupted */

    /* Destroy JAPI context */
    japi_destroy(ctx);
    return 0;
}
```



Getting Started...

Example requested function

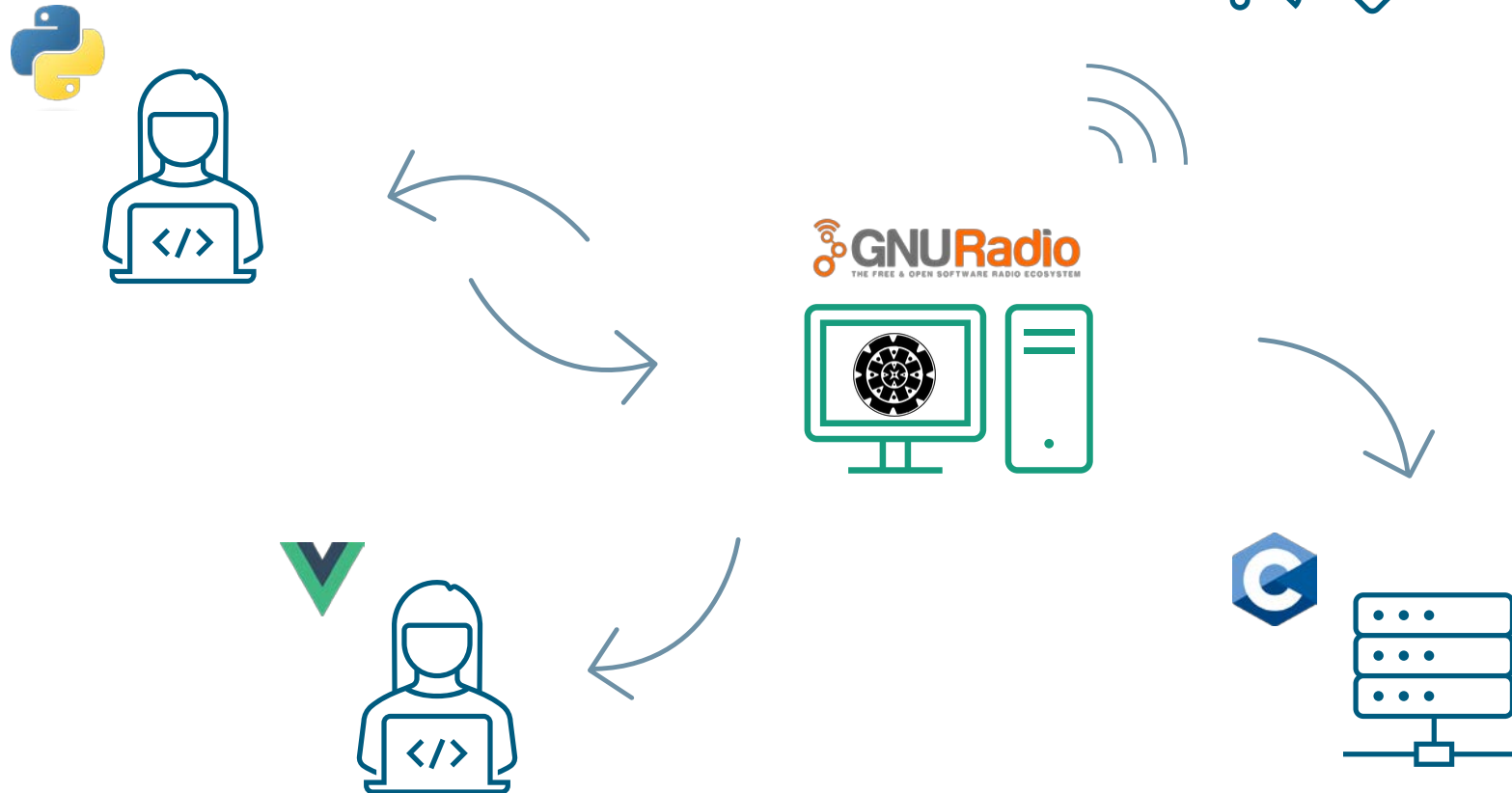
```
static void get_temperature(japi_context *ctx, json_object *request, json_object *response)
{
    double temperature;
    const char *unit;
    /* Get pointer on resources (i.e for example sensors values) */
    resources* sensor_values = (resources*) ctx->userptr;
    temperature = sensor_values->temperature;

    /* Provide the temperature in KELVIN (if requested) or CELSIUS (default) */
    if (japi_get_value_as_str(request, "unit", &unit) != 0 ) {
        fprintf(stderr, "Failed to get string value from key 'unit'\n");
    }
    if (unit != NULL && strcmp(unit, "kelvin") == 0) {
        temperature += 273;
    }

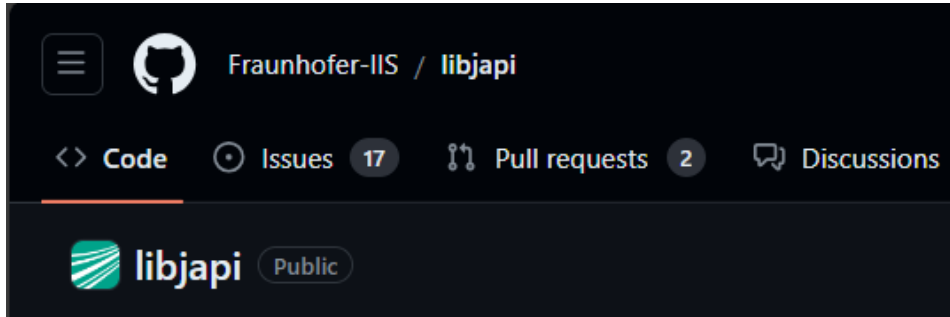
    /* Prepare and provide response */
    json_object_object_add(response, "temperature", json_object_new_double(temperature));
}
```

Example Use Case

SDR Modem



Join us!



<https://github.com/Fraunhofer-IIS/libjapi>

Roadmap

- Provide demo application as OSS
- Authentication
- JSON schema validator
- Websocket support
- usability improvements
- UART support instead of Ethernet

Thanks to all contributors!

- Michael Baron
- Christopher Stender
- Jannis Mainczyk
- Thomas Kolb
- Bastian Hamet
- ...

Contact

Katja Vornberger, M.Sc.
HF & SatKom
Tel. +49 9131 776-3118
katja.vornberger@fraunhofer.de

Fraunhofer IIS
Am Wolfsmantel 33
91058 Erlangen
www.fraunhofer.de

Selection of projects which use libjapi



- Interstellar (2018 - 2022)
 - ADC Board
 - DAC Board
 - RFSM
 - Test framework
- BEHOP (2019)
- FOBP (2019)
- E2UT (2020)
- SIMFO (2022)
- Edge Limit (2024)
- ORION (2024)
- ...

BEHOP Payload Emulator GUI v0.6.0

Beamhopping Payload Emulator **Fraunhofer** **IIS**

Emulator connection

Host: Port:

BSTP Input ☒ BSTP ReadBack ☐ Noise ☐ Noise ReadBack ☐ General

BSTP Calculation Mode: Super Frame length:

Symbol Rate:

Activation timestamp: Repetitions:

Transition type: Transition duration:

	SF Index	Beam 1	Beam 2	Beam 3	Beam 4	Split Beam
1	0	1	0	0	0	1
2	2	0	1	0	0	0
3	3	0	0	1	0	0
4	4	0	0	0	1	0

Log

```
>>> {"activation_time":0,"bstp":[{"beam_power":[1,0,0,0,1],"tick":0}, {"beam_power":[0,1,0,0,0],"tick":175011}, {"beam_power":[0,0,1,0,0],"tick":262517}, {"beam_power":[0,0,0,1,0],"tick":350022}], "repetitions":200, "request_type": "bstp", "transition_duration":5, "transition_type": "linear"}
<<< {"response": "bstp", "success": true, "log": "SP Period = 7000.440430"}
Remote: 'bstp' command successfully executed.
```