

# Python bindings for TINE

## TINE Workshop

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# Outline

- 1 Introduction
- 2 TINE via Python
- 3 Example

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# Motivation

## Language Bindings?



"I'm not against reinventing the wheel, but it's best if you have some experience before you do that, otherwise you'll end up with a triangular shaped rock." Anonymous

# The Python Programming Language

Space approved.



- open source script language
- available for many platforms
- extensive standard library
- multi-paradigm
- extendable
- embeddable

<http://www.python.org>

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# Accessing TINE

Take your pick.

## Generic:

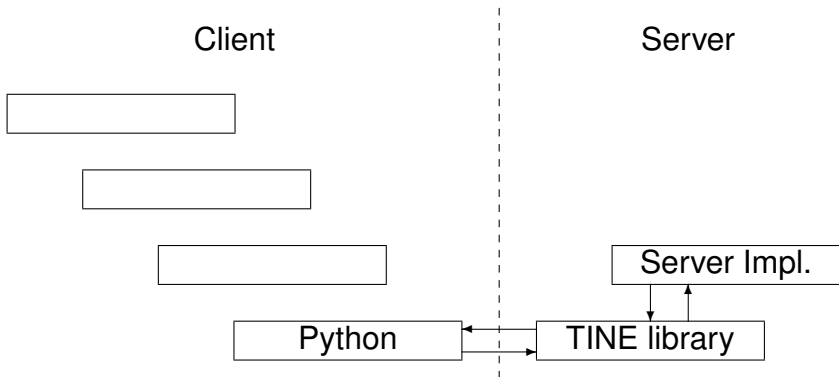
- Python Library: `asyncore`
- Python API: `CObjects`
- Python Library: `ctypes`

## Specific:

- C/C++-wrappers for specific TINE properties

# Generic: asyncore

Asynchronous socket handler.

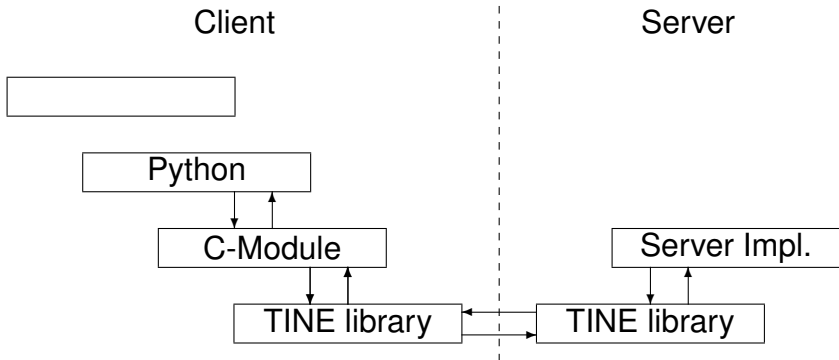


<http://docs.python.org/lib/module-asyncore.html>



# Generic: CObjects

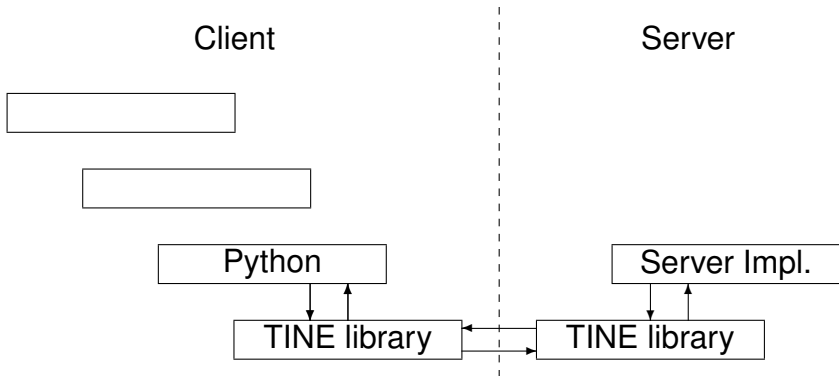
C-API for Extension Modules.



<http://docs.python.org/api/cObjects.html>  
<http://docs.python.org/ext/using-cobjects.html>

# Generic: ctypes

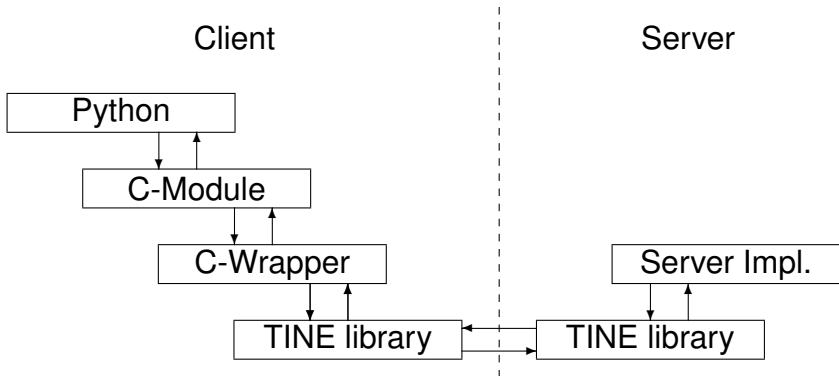
Foreign Function Library.



<http://docs.python.org/lib/module-ctypes.html>

# Specific: Property Wrappers

Giftwrapping TINE properties.



<http://docs.python.org/ext/ext.html>

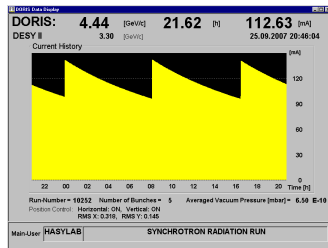
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# Example: DORIS

Accessing the DORIS ring current.

```
$> python
>>> import doris
Traceback (most recent call last):
  File "<stdin>", line 1, in ?
ImportError: No module named doris
>>> doris.current()
Traceback (most recent call last):
  File "<stdin>", line 1, in ?
NameError: name 'doris' is not defined
```



# Example: DORIS

## The Wrapper.

```

class doris {
public:
    static doris* instance();
    float current() const;

private:
    static doris *m_instance;

    doris();
    doris(const doris&);
    doris& operator=(const doris&);
    ~doris();
};

doris* doris::m_instance = 0L;

doris::doris() {
    FindNameServerOnNetwork();
}

doris::~~doris() { ... }

doris* doris::instance() { ... }

float doris::current() const {
    float current;

    DTYPE dout;
    dout.dFormat      = CF_FLOAT;
    dout.dArrayLength = 1;
    dout.data.fpstr   = &current;

    if (ExecLink("/DORIS/DoGatewayTunnel/0",
                "Current", &dout, 0L, CA_READ))
        current = 0.0;

    return current;
}

```

# Example: DORIS

## The C-Module.

```

static PyObject* doris_current (PyObject*, PyObject *args) {
    return Py_BuildValue("f", doris::instance()->current());
}

static PyMethodDef doris_methods[] = {
    { "current", doris_current, METH_NOARGS, "DORIS current" },
    { 0L, 0L, 0, 0L }
};

PyMODINIT_FUNC initedoris (void) {
    Py_InitModule4 ("doris",
                   doris_methods,
                   "Python bindings for DORIS",
                   0,
                   PYTHON_API_VERSION);

    if (PyErr_Occurred())
        Py_FatalError("Unable to initialize doris module");
}

```

# Example: DORIS

Putting it all together.

```
$> gcc -g -fPIC -Wall -I... -c doris.cpp
$> gcc -g -fPIC -Wall -I... -c doris_py.cpp
$> gcc -fPIC -shared *.o -o doris.so -L... -ltine
```

```
$> PYTHONPATH=. python
>>> import doris
>>> doris.current()
0.049649983644485474
```