SciPy Conference 2012
A talk on
SBHS Virtual labs using Python

Team SBHS led by
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Speaker
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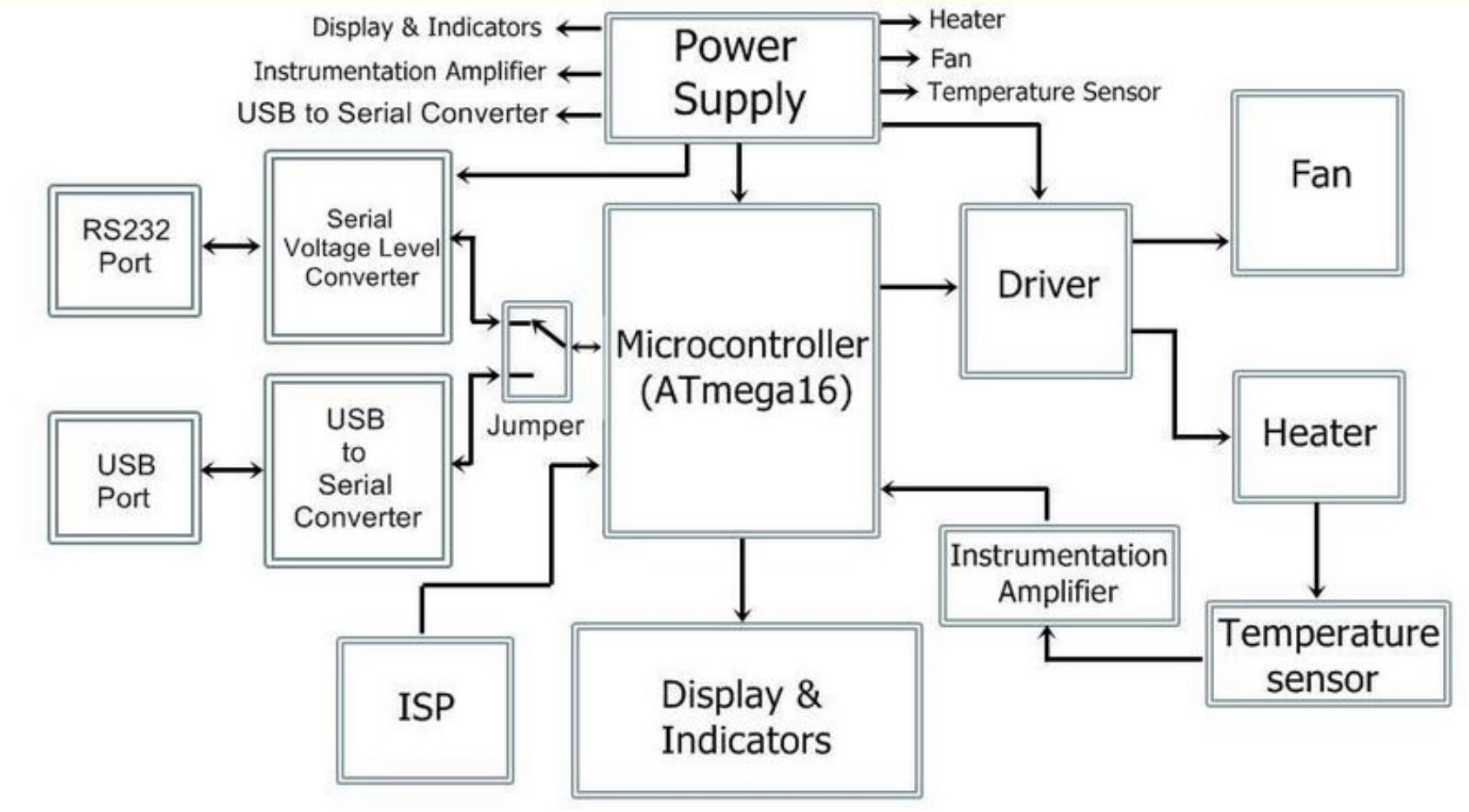
Virtual Labs

- **Simulation Virtual lab**
- **Remote triggered Virtual lab**

Single Board Heater System

Block diagram of SBHS



What does this system do?

Controlling the temperature of a blade

- **by heating with heater**
- **by cooling with a fan**

Main components of SBHS

- **Heater assembly**

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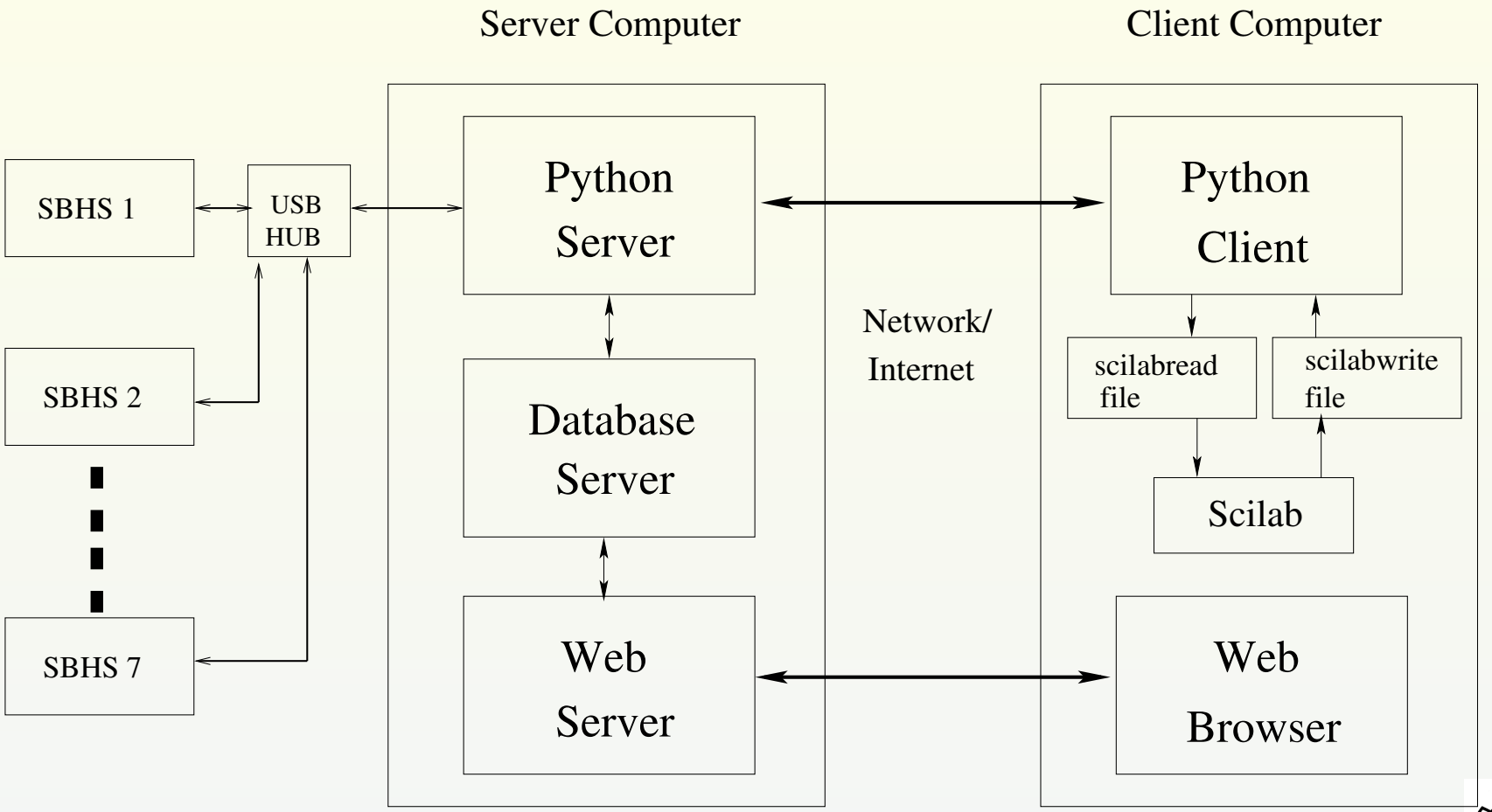
- **Temperature Sensor**
  - **AD590**
  - **Reading in μA per Kelvin**

Software architecture SBHS vlabs



Implementation

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Server side Hardware access

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- **Python is used for interfacing to hardware**

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- **Baud rate etc can be easily set**

Implementation

Server side Hardware access

- **Python is used for interfacing to hardware**
- **Serial library included**
- **Baud rate etc can be easily set**
- **Direct communication to /dev/ttyUSB* files**

Implementation contd...

Implementation contd...

Server side web hosting

- **Socket, RMI, http etc.. ways of client-server communication**

Implementation contd...

Server side web hosting

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- **HTTP is chosen**

Implementation contd...

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- **Why?**

Implementation contd...

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Implementation contd...

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- **Why?It is browser based**

Implementation contd...

Server side web hosting

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Implementation contd...

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- **Obvious need of a web server**

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- **Examples of web server, apache, nginx, IIS etc..**

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Implementation contd...

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- **Examples of web server, apache, nginx, IIS etc..**
- **But web server will handle only requests, routine calls and traffic management**
- **Need of server side scripting language**

Implementation contd...

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- **Examples of server side scripting language, php, python, perl, asp etc..**

Implementation contd...

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Implementation contd...

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Implementation contd...

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- **We choose python**
- **But plane python will require coding from scratch**
- **Choose Django (python based web development framework)**

Implementation contd...

Implementation contd...

Why Django ?

Implementation contd...

Why Django ?

- **Session management**

Implementation contd...

Why Django ?

- **Session management**
- **Data security**

Implementation contd...

Why Django ?

- **Session management**
- **Data security**
- **Url management**

Implementation contd...

Implementation contd...

Client side

- **Python client**

Implementation contd...

Client side

- **Python client**
- **Separate settings file**

Implementation contd...

Client side

- **Python client**
- **Separate settings file**
- **GET and POST technique**

Implementation contd...

Implementation contd...

URL's

- **http://vlabs.iitb.ac.in/sbhs/hardware/checkconnection**

Implementation contd...

URL's

- **http://vlabs.iitb.ac.in/sbhs/hardware/checkconnection**
- **http://vlabs.iitb.ac.in/sbhs/hardware/clientversion**

Implementation contd...

URL's

- **http://vlabs.iitb.ac.in/sbhs/hardware/checkconnection**
- **http://vlabs.iitb.ac.in/sbhs/hardware/clientversion**
- **http://vlabs.iitb.ac.in/sbhs/hardware/communicate**

Python Server structure

__init__.py

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urls.py

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- **define urls for communication**

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models.py

Python Server structure

__init__.py

urls.py

- **define urls for communication**

models.py

- **create classes for database communication with tables and corresponding fields**

Python server structure cont...

sbhs.py

Python server structure cont...

sbhs.py

- **main file for communication with SBHS over USB**

Python server structure cont...

sbhs.py

- **main file for communication with SBHS over USB**
- **has 11 functions like setHeat, setFan, getTemp etc.**

Thank you

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