

# Networked Programs

## Chapter 12



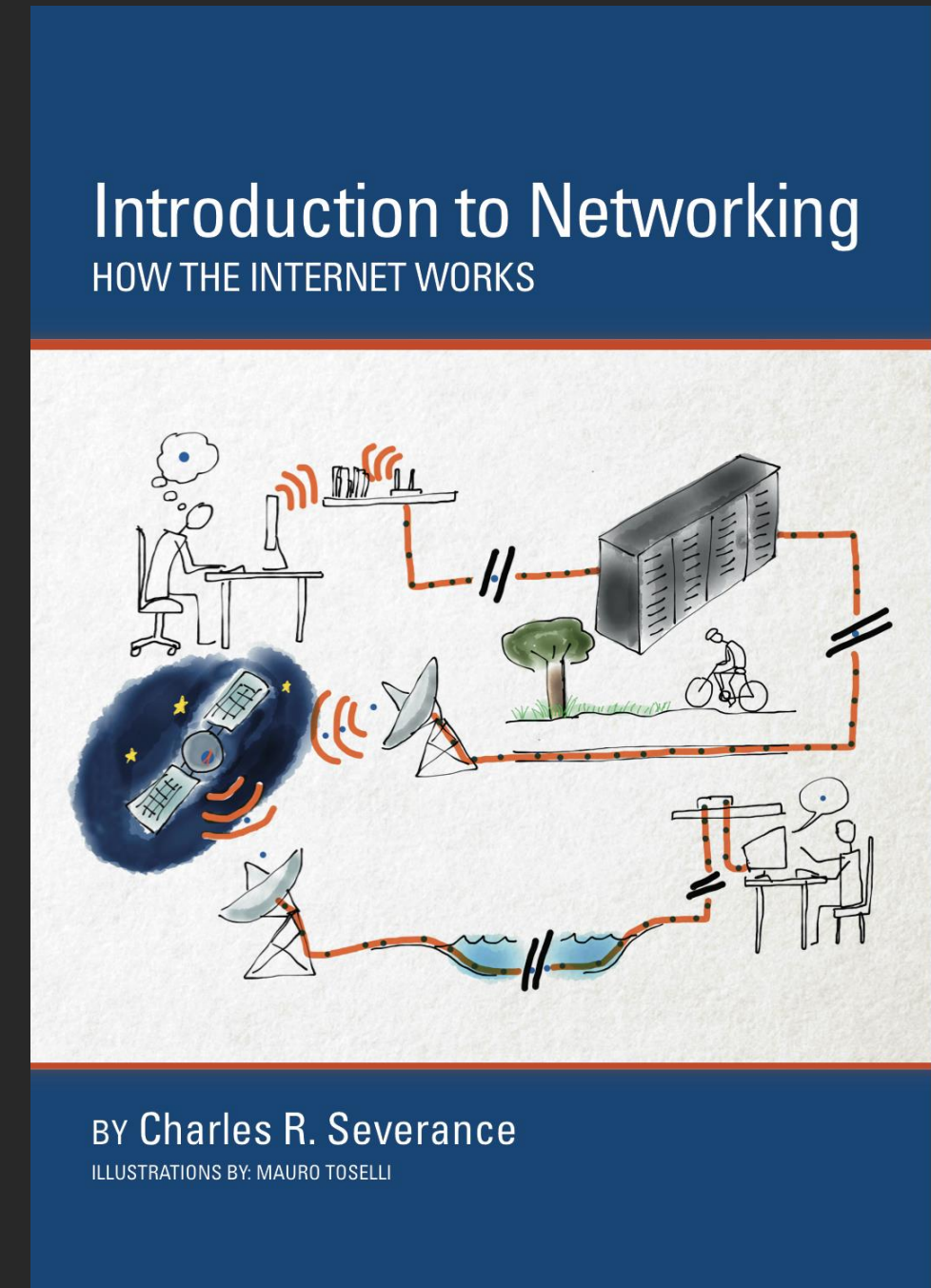
Python for Everybody  
[www.py4e.com](http://www.py4e.com)



# A Free Book on Network Architecture

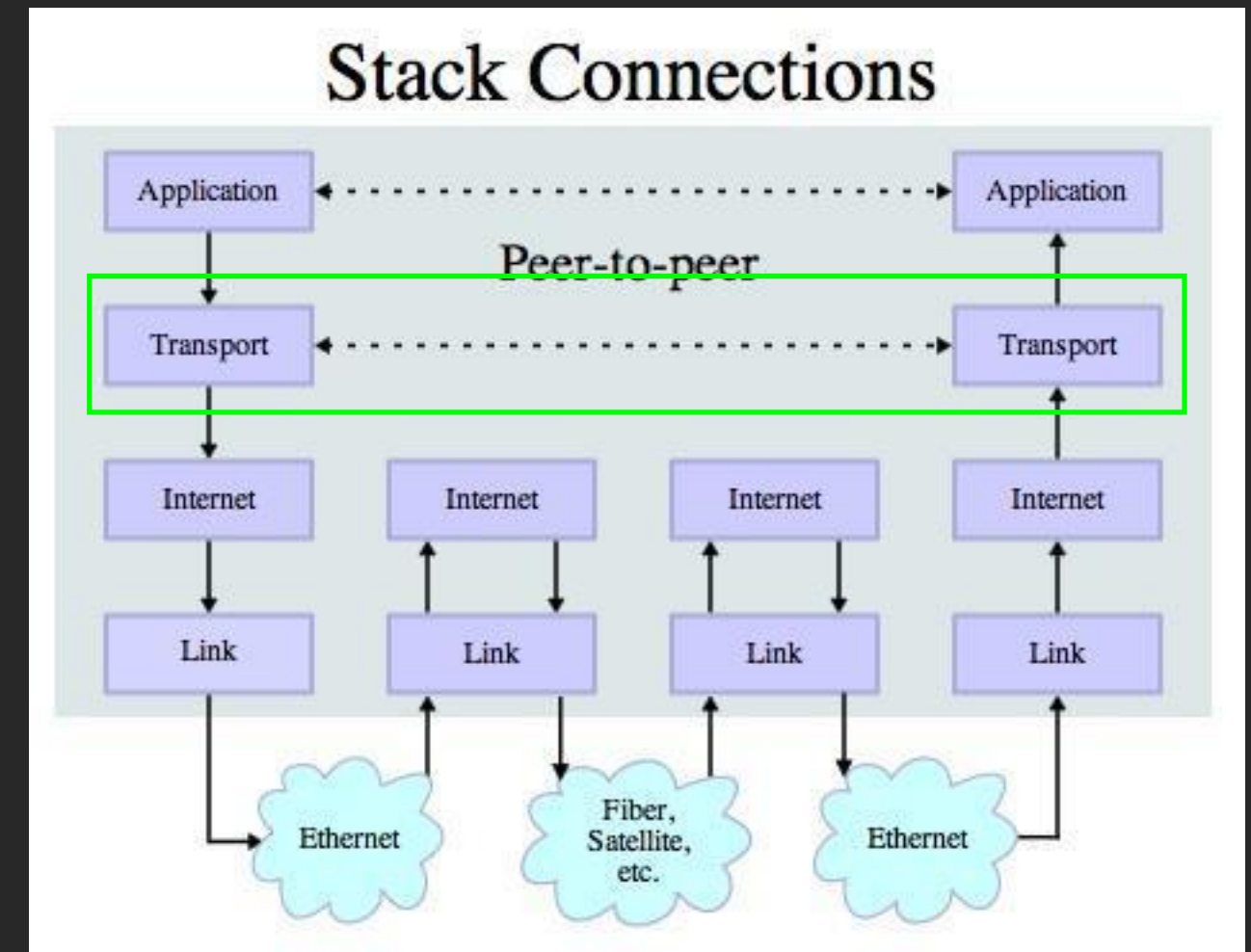
If you find this topic  
area interesting and/or  
need more detail

[www.net-intro.com](http://www.net-intro.com)

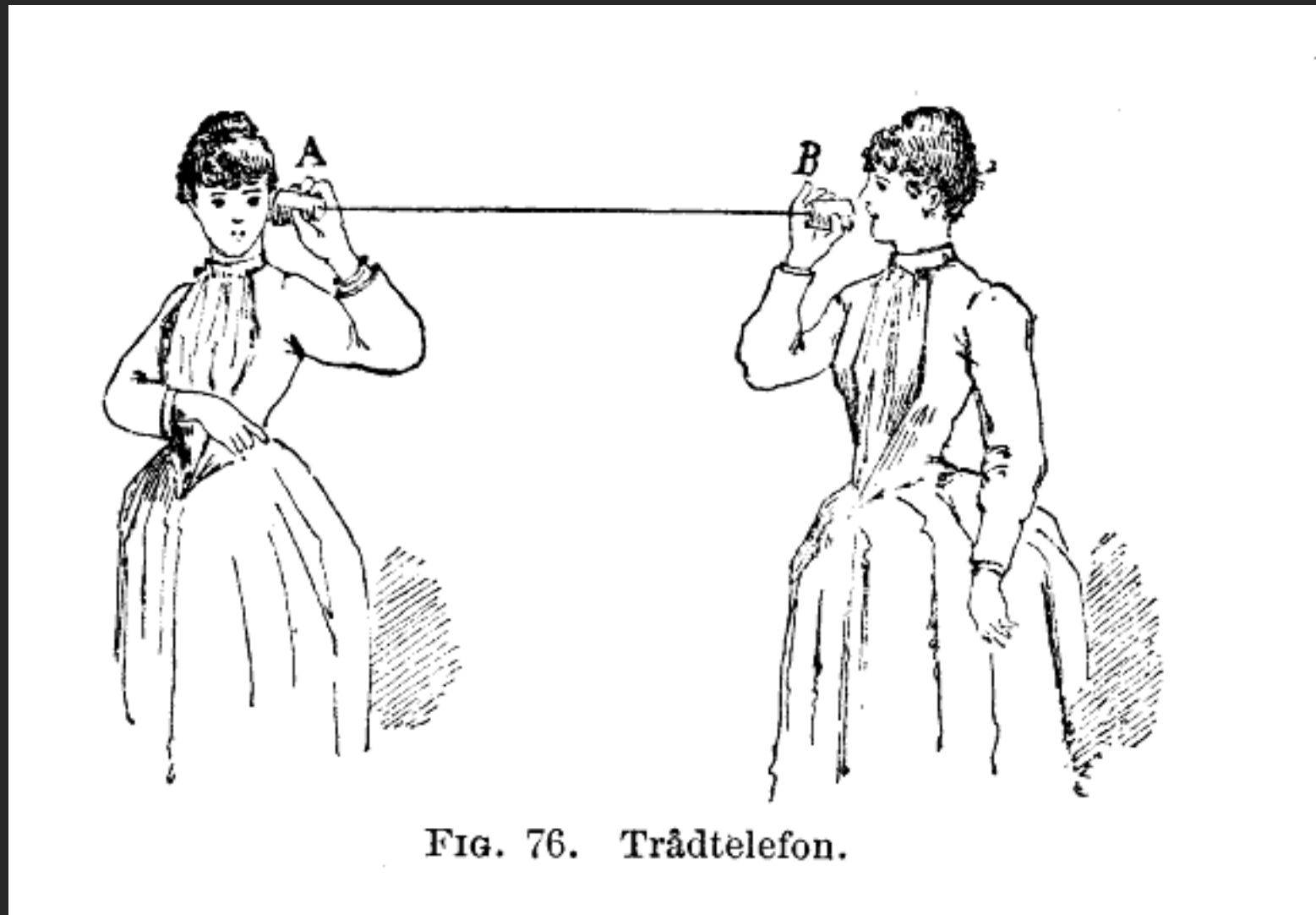


# Transport Control Protocol (TCP)

- Built on top of IP (Internet Protocol)
- Assumes IP might lose some data - stores and retransmits data if it seems to be lost
- Handles “flow control” using a transmit window
- Provides a nice reliable **pipe**



Source: [http://en.wikipedia.org/wiki/Internet\\_Protocol\\_Suite](http://en.wikipedia.org/wiki/Internet_Protocol_Suite)



[http://en.wikipedia.org/wiki/Tin\\_can\\_telephone](http://en.wikipedia.org/wiki/Tin_can_telephone)



<http://www.flickr.com/photos/kitcowan/2103850699/>

# TCP Connections / Sockets

“In computer networking, an Internet **socket** or network **socket** is an endpoint of a bidirectional **inter-process** communication flow across an **Internet** Protocol-based computer network, such as the **Internet**.”



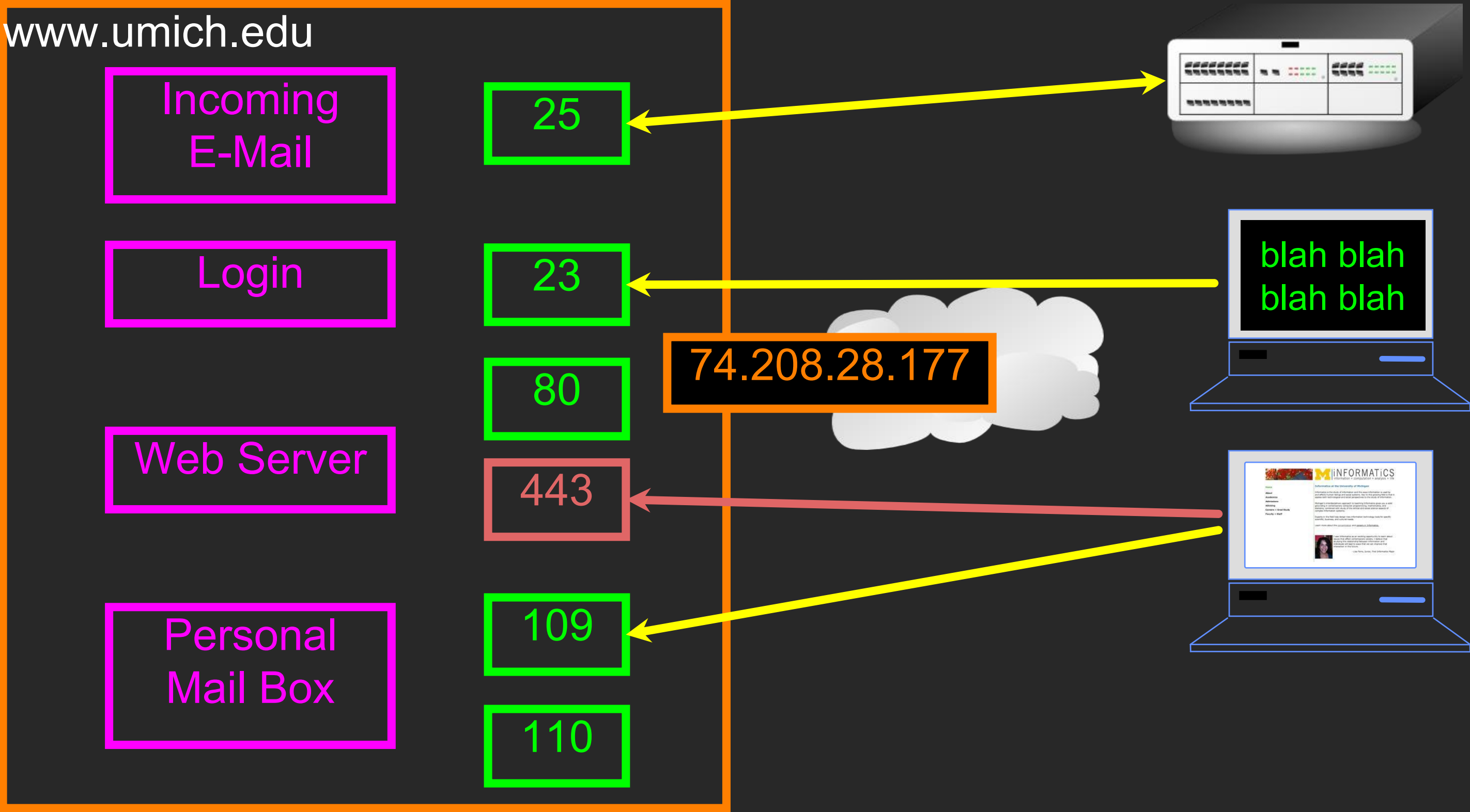
[http://en.wikipedia.org/wiki/Internet\\_socket](http://en.wikipedia.org/wiki/Internet_socket)

# TCP Port Numbers

- A port is an **application-specific** or process-specific software communications endpoint
- It allows multiple networked applications to coexist on the same server.
- There is a list of well-known TCP port numbers

[http://en.wikipedia.org/wiki/TCP\\_and\\_UDP\\_port](http://en.wikipedia.org/wiki/TCP_and_UDP_port)



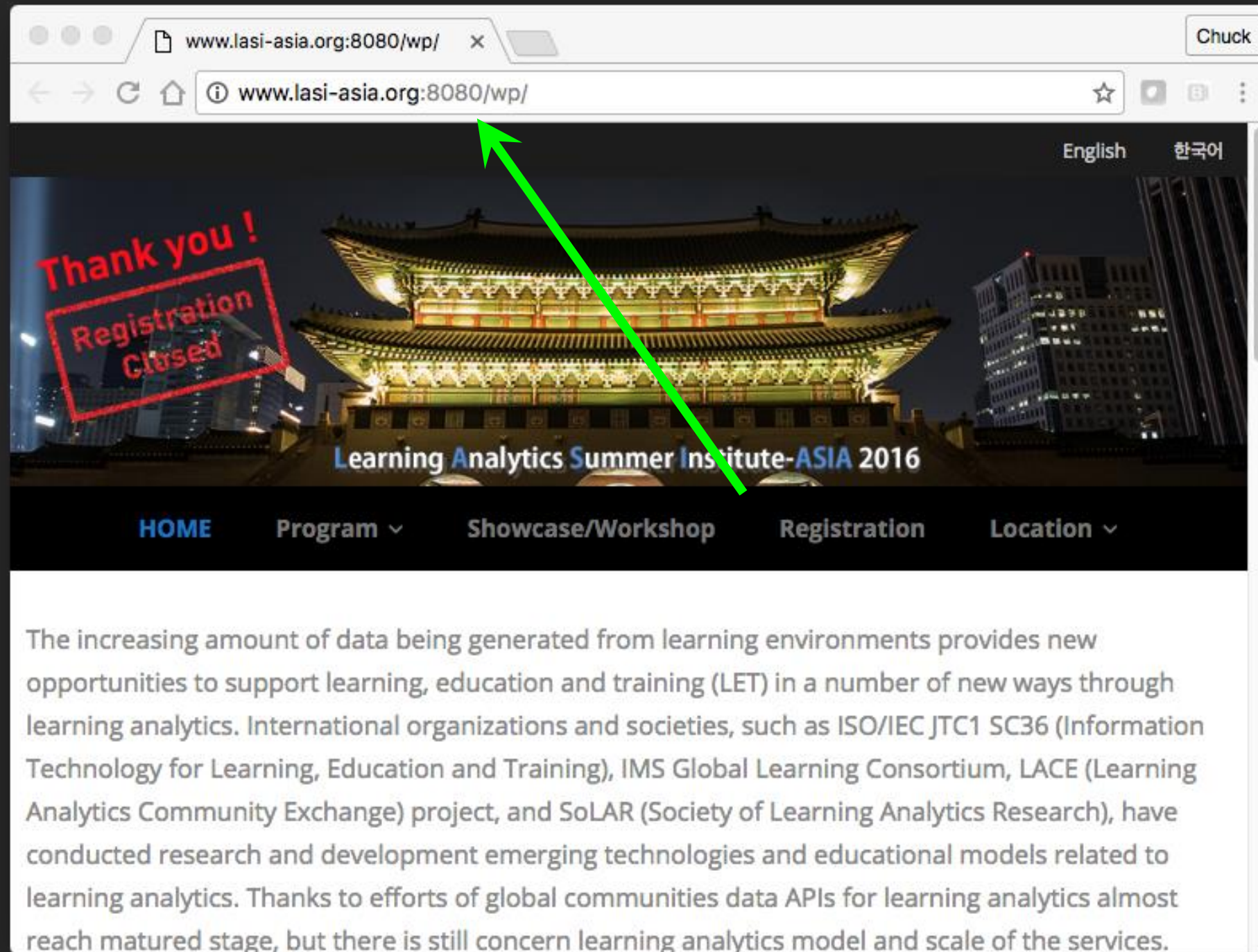


# Common TCP Ports

- Telnet (23) - Login
- SSH (22) - Secure Login
- HTTP (80)
- HTTPS (443) - Secure
- SMTP (25) (Mail)
- IMAP (143/220/993) - Mail Retrieval
- POP (109/110) - Mail Retrieval
- DNS (53) - Domain Name
- FTP (21) - File Transfer

[http://en.wikipedia.org/wiki/List\\_of\\_TCP\\_and\\_UDP\\_port\\_numbers](http://en.wikipedia.org/wiki/List_of_TCP_and_UDP_port_numbers)





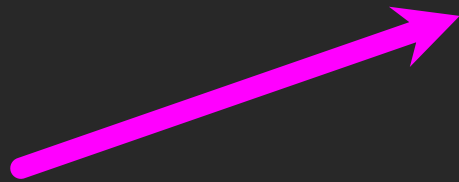
Sometimes we see the port number in the URL if the web server is running on a “non-standard” port.

# Sockets in Python

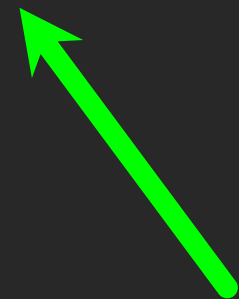
Python has built-in support for TCP Sockets

```
import socket
mysock = socket.socket(socket.AF_INET, socket.SOCK_STREAM)
mysock.connect( ('data.pr4e.org', 80) )
```

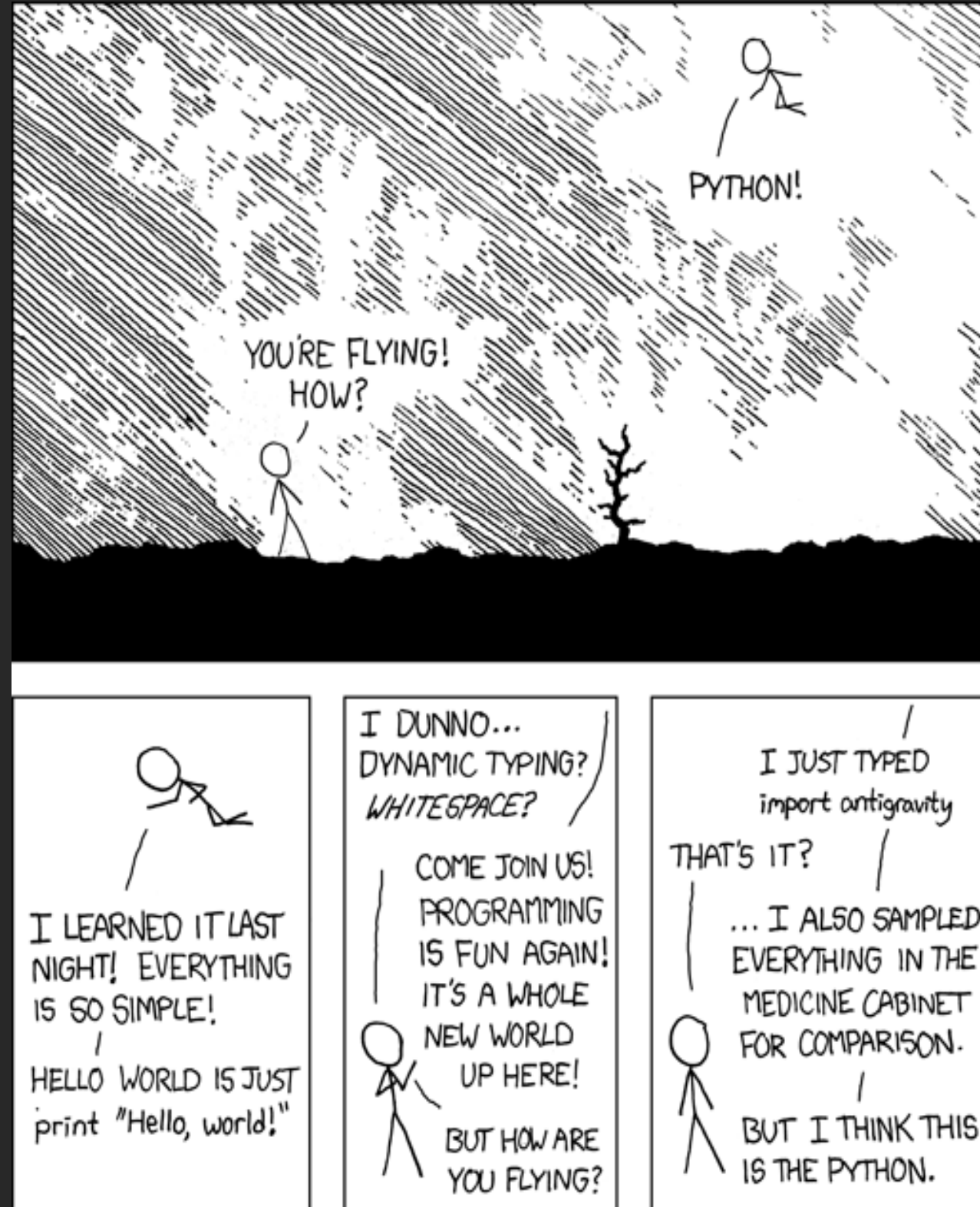
Host



Port



<http://docs.python.org/library/socket.html>



<http://xkcd.com/353/>

# Communicating on Sockets in Python





## Acknowledgements / Contributions



These slides are Copyright 2010- Charles R. Severance ([www.dr-chuck.com](http://www.dr-chuck.com)) of the University of Michigan School of Information and [open.umich.edu](http://open.umich.edu) and made available under a Creative Commons Attribution 4.0 License. Please maintain this last slide in all copies of the document to comply with the attribution requirements of the license. If you make a change, feel free to add your name and organization to the list of contributors on this page as you republish the materials.

Initial Development: Charles Severance, University of Michigan School of Information

... Insert new Contributors here