asyncio — Asynchronous I/O, event loop, and concurrency tools

Purpose: An asynchronous I/O and concurrency framework.

The `asyncio` module provides tools for building concurrent applications using coroutines. While the `threading` module implements concurrency through application threads and `multiprocessing` implements concurrency using system processes, `asyncio` uses a single-threaded, single-process approach in which parts of an application cooperate to switch tasks explicitly at optimal times. Most often this context switching occurs when the program would otherwise block waiting to read or write data, but `asyncio` also includes support for scheduling code to run at a specific future time, to enable one coroutine to wait for another to complete, for handling system signals, and for recognizing other events that may be reasons for an application to change what it is working on.

Note

In Python 3.5, `asyncio` is still a *provisional* module. The API was stablized in Python 3.6, and most of the changes were backported to later patch releases of Python 3.5. As a result, the module may work slightly differently under different versions of Python 3.5.

See also

- Standard library documentation for asyncio
- **PEP 3156** – *Asynchronous IO Support Rebooted: the "asyncio" Module*
- **PEP 380** – *Syntax for Delegating to a Subgenerator*
- **PEP 492** – *Coroutines with async and await syntax*
- `concurrent.futures` – Manage Pools of Concurrent Tasks
- `socket` – Low-level network communication
- `select` – Low-level asynchronous I/O tools
- `socketserver` – Framework for creating network servers
- asyncio: What's New in Python 3.6 – Summary of the changes to `asyncio` as the API stablized in Python 3.6.
- trollius – A port of Tulip, the original version of asyncio, to Python 2.
- The New asyncio Module in Python 3.4: Event Loops – Article by Gastón Hillar in Dr. Dobb's
- Exploring Python 3's Asyncio by Example – Blog post by Chat Lung
- A Web Crawler With asyncio Coroutines – An article in *The Architecture of Open Source Applications* by A. Jesse Jiryu Davis and Guido van Rossum
- Playing with asyncio – blog post by Nathan Hoad
- Async I/O and Python – blog post by Mark McLoughlin
- A Curious Course on Coroutines and Concurrency – PyCon 2009 tutorial by David Beazley
- How the heck does async/await work in Python 3.5? – blog post by Brett Cannon
- *Unix Network Programming, Volume 1: The Sockets Networking API, 3/E* By W. Richard Stevens, Bill Fenner, and Andrew M. Rudoff. Published by Addison-Wesley Professional, 2004. ISBN-10: 0131411551
- *Foundations of Python Network Programminng, 3/E* By Brandon Rhodes and John Goerzen. Published by Apress, 2014. ISBN-10: 1430258543

Implementing MapReduce

Asynchronous Concurrency Concepts

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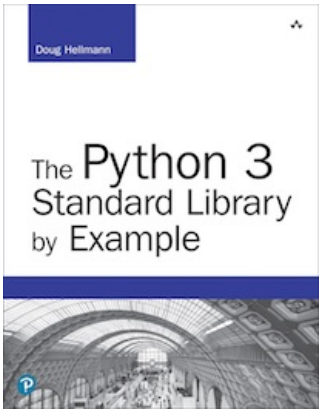

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The output from all the example programs from PyMOTW-3 has been generated with Python 3.7.1, unless otherwise noted. Some of the features described here may not be available in earlier versions of Python.

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