

**Distributed Task Automation with Python**

**Course Number:** PYTH-269
**Duration:** 2 days

**Overview**

This Distributed Task Automation with Python training course teaches developers the core Python skills to write almost any automation script and run it in a distribution fashion. Participants learn how to apply containerization with Docker, access database data with Python, send messages with Python and RabbitMQ, orchestrate distributed tasks with Celery, and execute remote SSH commands.

**Note:** This course follows Accelebrate's [Python Task Automation course](file:////training/python-task-automation).

**Prerequisites**

All students should have taken Accelebrate's [Python Task Automation course](file:////training/python-task-automation) or have significant experience with the topics covered in that course.

**Materials**

All Python Task Automation training students receive comprehensive courseware.

**Software Needed on Each Student PC**

* Any Windows, Linux, or Mac OS X operating system
* Standard Python 3.x or Anaconda Python 3.x
* Visual Studio Code (other editors may be used, but only Visual Studio Code will be configured for a complete Python programming environment)

**Objectives**

* Deploy tasks at scale with Celery
* Employ Python and Celery in a Containerized Environment
* Use the PostgreSQL database with Python
* Send Messages with Python and RabbitMQ
* Apply basic and more advanced Python Celery skills

**Outline**

* Introduction
* Development Environment (Very Quick Overview)
	+ Configure VS Code for Python script development
	+ Code Reformatting with Black
	+ Debugging Python Scripts with VS Code
* Simple Task Distribution
	+ Use SSH to run Remote Commands
	+ Use SSH to Download/Upload Files
	+ Write Python Scripts to run code on remote Linux Computers
	+ Collect Data from remote Linux Computers
* Containerization
	+ What is a Container?
	+ What is Docker?
	+ What is Docker Hub?
	+ Images and Containers
	+ Create an Image with Dockerfile
	+ Run Containers
	+ Configure Containers with Environment Variables
	+ Docker Compose
	+ Docker Compose Networking
	+ Docker Compose Volume
* Remote Data Storage
	+ What is Remote Data Storage?
	+ Running a Data Storage in a Container
	+ Running PostgreSQL in a Container
	+ Running PostgreSQL Client Tool in a Container
	+ Configure with Docker Compose
	+ Read/Write Data to PostgreSQL with Python SQLAlchemy
* Remote Message Broker
	+ What is a Message Broker?
	+ Running a Message Broker in a Container
	+ Running RabbitMQ in a Container
	+ Running RabbitMQ Client Tool in a Container
	+ Configure with Docker Compose
	+ Read/Write Data to RabbitMQ with Python and Pika
* Task Automation at Scale with Celery
	+ Overview of Celery and its features
	+ Installing Celery and its dependencies
	+ Setting up a simple Celery project
* Celery Basics
	+ Defining and running tasks
	+ Task decorators and options
	+ Passing arguments and results between tasks
	+ Task retries and error handling
	+ Monitoring and managing Celery workers
* Advanced Celery Concepts
	+ Task serialization and message brokers
	+ Task routing and prioritization
	+ Task result backends
	+ Grouping and chaining tasks
	+ Scheduling periodic tasks with Celery beat
* Scaling and Deployment
	+ Load balancing tasks with multiple workers
	+ Deploying Celery in a production environment
	+ Configuring Celery for high availability
	+ Best practices for handling long-running tasks
	+ Monitoring and performance tuning
* Conclusion