

# Power of 3 - Docker , Python and a Relational Database

– Sumeet Kabra

ORACLE

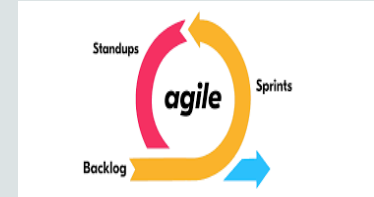
Copyright © 2019, Oracle and/or its affiliates. All rights reserved. |

## Safe Harbor Statement

The following is intended to outline our general product direction. It is intended for information purposes only, and may not be incorporated into any contract. It is not a commitment to deliver any material, code, or functionality, and should not be relied upon in making purchasing decisions. The development, release, and timing of any features or functionality described for Oracle's products remains at the sole discretion of Oracle.



Original and © by Scott Adams, 1995



*P  
A  
R  
A  
D  
I  
G  
M  
  
S  
H  
I  
F  
T*

*SOFTWARE ENGINEERING*



# Ok...Who should be aware about all this ?



DEVELOPERS

SYSADMINS

IT MANAGERS



# Python --- a simple and powerful programming language



- Created by Guido van Rossum and first released in 1991
- Language's name is a tribute to the British comedy group “Monty Python”
- Interpreted, high-level
- Multi-purpose (Console based apps ,Web based , GUI , Scripting etc. )
- Strongly Typed and Dynamically Typed

# Why Python ??

- Extensive Python standard libraries and loads of external libraries
  - <https://docs.python.org/3/library/>
- Ease of use
  - Example of Hello World program

C

```
# include <stdio.h>
int main() {
printf("Hello, World!");
return 0;
}
```

Java

```
public class HelloWorld {
public static void main(String[] args) {
System.out.println("Hello, World");
}
}
```

Python

```
print("Hello, World!")
```

## Python – Installation / Build

- Python can be directly installed as software binaries on some OS such as Windows using Python installer
- Many Linux distros provide package installer
- On most OS , specially Linux distros , python can be build from source
- Mac OS -- Python can be installed using Homebrew
- iOS / Android – Apps are available to have Python environment+Editor
- Python Virtual Environment
  - Usually OS has system Python 2
  - Install Python3 and create a virtual environment , not affecting system python
  - `python3 -m venv <path to virtual environment>` [<https://docs.python.org/3/library/venv.html#module-venv>]



## SQLite – Lightweight RDBMS



- An in-process library that implements a self-contained, zero-configuration, serverless, transactional SQL database engine
- ACID compliant
- Popular choice as embedded database software for local/client storage in application software
- Not suitable for client-server configuration , enterprise scale applications
- Browser add ons / Software available to manage SQLite databases

# Python and SQLite



- Python has standard library providing SQLite interface
- No need to install SQLite or any additional library
- Require to import library sqlite3 in the python program
- Sample code to create a connection to SQLite database

```
import sqlite3 # importing sqlite3 module
from contextlib import closing
conn=sqlite3.connect("words.db") # created a connection object
conn.row_factory=sqlite3.Row
with closing(conn.cursor()) as c: # created cursor object from cursode method of connection object
    query="select * from simp_words" # simp_words is a table in words.db database
    ## Then called the execute method of the cursor object to execute the query
    c.execute(query)
    wordlist=c.fetchall()
for words in wordlist:
    print(words["name"])
if conn:
    conn.close()
```

# Python and Oracle



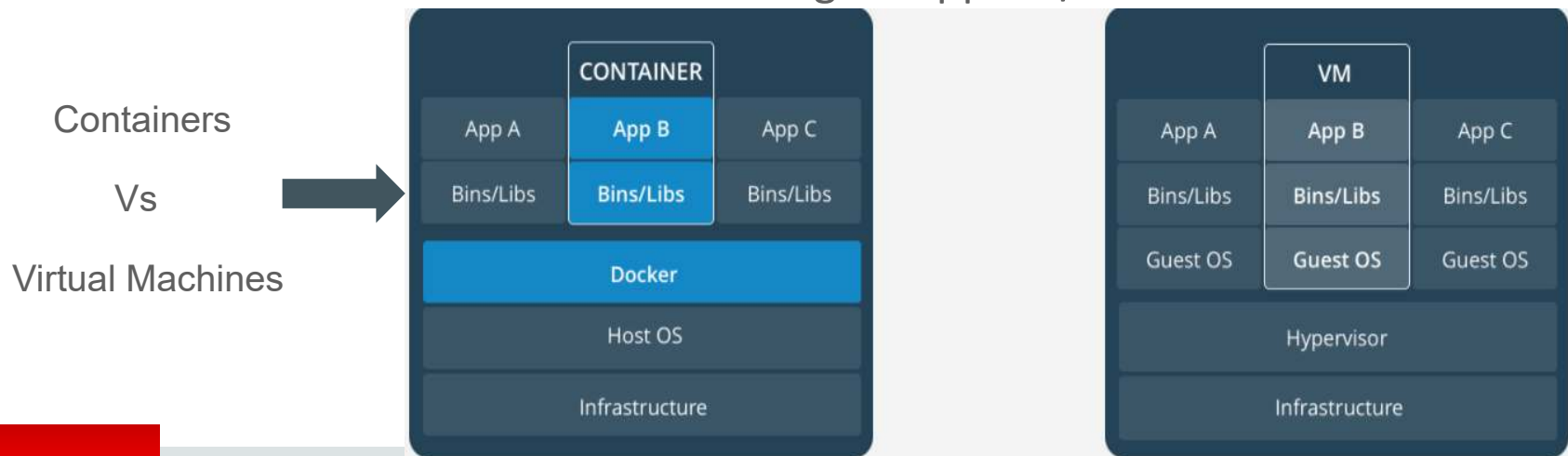
- Python can be installed on Oracle Linux from
  - Extra Packages for Enterprise Linux (EPEL) repository and/or
  - Software Collection Library (SCL)
  - OL6 has system Python 2.6 and OL7 has system Python 2.7
- cx\_Oracle is a module that enables access to Oracle Database
  - `python -m pip install cx_Oracle`
  - [https://oracle.github.io/python-cx\\_Oracle/](https://oracle.github.io/python-cx_Oracle/)
- cx\_Oracle depends on Oracle Instant Client which can be installed via RPM

```
import cx_Oracle
conn = cx_Oracle.connect('system/manager@localhost/orcl')
cur = conn.cursor
cur.execute('select * from employee')
for row in cur:
    print(row)
cur.close()
conn.close()
```

# Docker – a containerization tool



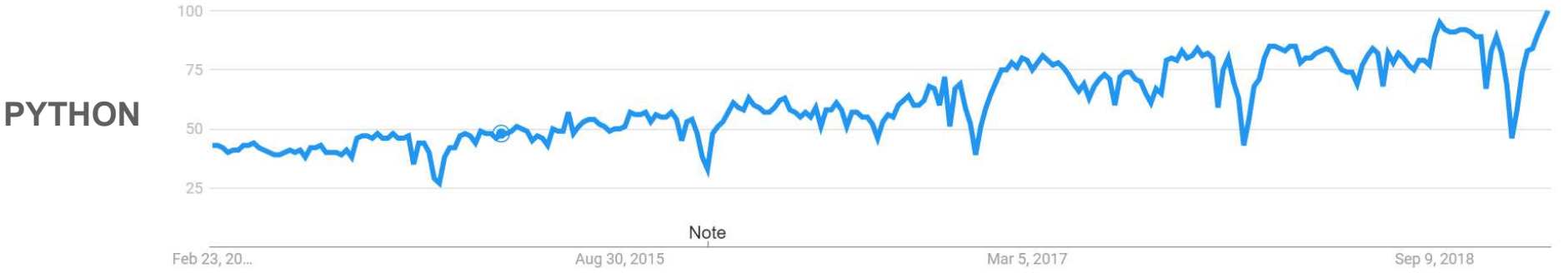
- Containerization is virtualization at OS level
- Docker Engine is installed and runs as daemon at OS level
- Docker containers runs over it from the images supplied/built



# Docker and Oracle - Oracle Container Runtime for Docker

- facilitates creation and distribution of applications across Oracle Linux systems and other operating systems that support Docker
- consists of the Docker Engine, which packages and runs the applications, and integrates with the Docker Hub, Docker Store and Oracle Container Registry
- Installation and Configuration
  - [https://docs.oracle.com/cd/E52668\\_01/E87205/html/docker\\_install\\_upgrade\\_yum.html](https://docs.oracle.com/cd/E52668_01/E87205/html/docker_install_upgrade_yum.html)

# Docker and Python – Trends



## Bringing 3 Together....



- Hangman application code in Python with Wordlist ( 3 tables) in “wordlist.db” SQLite database , deployed as a Docker Image in Docker Hub
- It can be containerized now on any platform supporting Docker using simple Docker client commands
  - `$ docker pull fundock/hangman`
  - `$ docker run -i fundock/hangman`

DEMO



