# IMS Log Data Analysis and Visualization

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CA Technologies

November 2018

Session HG




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# About this presentation

- Practical introduction to IMS analytics
- Show one possible way how to approach IMS data analytics
- Demo samples included
- **NOT** ultimate guide to IMS data analytics

# Data science definition

*Despite the excitement around “data science”, “big data”, and “analytics", the ambiguity of these terms has led to poor communication between data scientists and those who seek their help.*[*]

Data mining - Nontrivial retrieval of implicit, formerly unknown and potentially useful information from data.

[*][Harlan Harris, Sean Murphy, and Marck Vaisman. Analyzing the Analyzers: An Introspective Survey of Data Scientists and Their Work. O'Reilly Media, Inc., 2013.]

# Resources

## Github https://github.com/volov0/IMS-analytics

- ftpdown.py – preprocessing  script, downloading logs
- imslog.py – preprocessing, transforming binary to dataframes
- logspecs.py – support functions for scripts
- logdownloader.py – support functions for preprocessing
- appetizer.ipynb – rba plot over time
- deadlock.ipynb – deadlock report
- dataframe.ipynb – introducing log dataframe
- extensions.ipynb – Data set extension plot
- whatsup.ipynb – display what is running in my IMS

# Information available in IMS logs

- Application statistics
- Database activity
- DB updates statistics
- CPU consumption
- Message queue statistics
- Abend information
- Deadlock data
- Monitor statistics
- Buffer statistics
- OLR statistics
- And many more…

# Tools – all open source

ANACONDA.

pandas

$y_{it} = \beta' x_{it} + \mu_i + \epsilon_{it}$

matplotlib

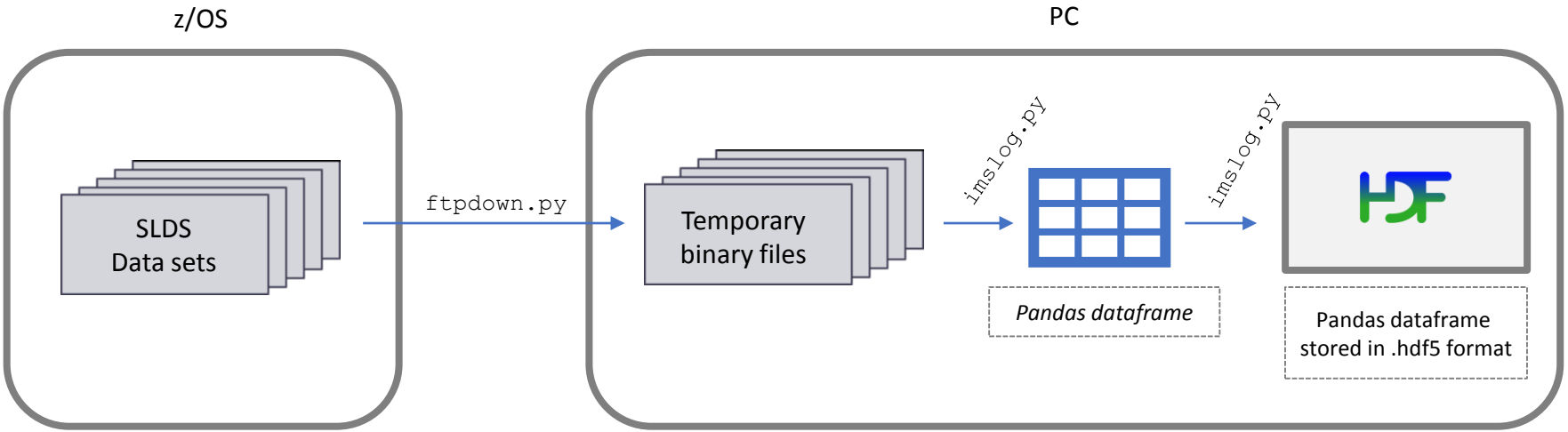
jupyter

HDF

python™

APACHE Spark™

# Preprocessing Data Flow



# Dataframe concept

- Fundamental data structure provided by Pandas (and Spark)
- Contains row for each record and a column for each variable
- Provides methods for accessing, modifying and exporting data

| | type | datetime | psb | extime | ccode | job | step | dlicnt | vsamrio | vsamwio | osamrio | osamwio | totio | iotime | lktime |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **951** | 07 | 2018-08-06 11:54:25.997874 | HPOIO | 9093425 | 0 | HPOD158R | STPRRC00 | 0 | 0 | 0 | 0 | 0 | 0 | 12 | 12 |
| **978** | 07 | 2018-08-06 11:55:06.219089 | HPOIO | 8568734 | 0 | HPOD158R | STPRRC00 | 0 | 0 | 0 | 0 | 0 | 0 | 12 | 12 |
| **950** | 07 | 2018-08-06 11:59:30.614678 | HPOIO | 8898327 | 0 | HPO7300X | STPRRC00 | 0 | 0 | 0 | 0 | 0 | 0 | 12 | 12 |
| **987** | 07 | 2018-08-06 12:06:16.777518 | HPOIO | 9304078 | 0 | HPO7300R | STPRRC00 | 0 | 0 | 0 | 0 | 0 | 0 | 12 | 12 |
| **14649** | 07 | 2018-08-06 12:06:26.448871 | PSBHPO04 | 1632971573 | 0 | HPO7300R | STPRRC00 | 2200 | 187 | 733 | 0 | 0 | 920 | 268775980 | 12 |
| **34448** | 07 | 2018-08-06 12:07:02.198581 | HPODOPT1 | 15522441876 | 0 | HPO7300R | $$@ | 104161 | 11217 | 0 | 0 | 0 | 11217 | 2298755228 | 5341708 |
| **69792** | 07 | 2018-08-06 12:07:21.535785 | PSBHPO04 | 9460267441 | 0 | HPO7300S | STPRRC00 | 31910 | 1557 | 5213 | 0 | 0 | 6770 | 2016884332 | 1324 |

# Deadlock report – DFSERA10 alternative

DFSERA10 control statements:

```
CONTROL  CNTL
OPTION   PRINT OFFSET=5,VALUE=67FF,FLDLEN=2,COND=E,EXITR=DFSERA30
END
```

Deadlock report produced by DFSERA10/DFSERA30:

```
RESOURCE DMB-NAME LOCK-LEN LOCK-NAME
01 OF 02 DVAS7310    08    0018F801C28201D7
KEY IS ROOT KEY OF DATA BASE RECORD ASSOCIATED WITH LOCK
KEY=(7033000163)
       IMS-NAME TRAN/JOB PSB-NAME DBD/PCB# PST#  RGN  CALL LOCK  LOCKFUNC STATE
WAITER IMSX     HPO7300S PSBHPO04 INDEXPCB 00002 BMP  ISRT GBIDP 22400318  06-P
BLCKER IMSX     HPO7300R PSBHPO04 -------- 00001 BMP  ---- ----- --------  04-P
.....................................................................................
RESOURCE DMB-NAME LOCK-LEN LOCK-NAME     - WAITER FOR THIS RESOURCE IS VICTIM
02 OF 02 DVAS7310    08    0018F801C28201D7
KEY IS ROOT KEY OF DATA BASE RECORD ASSOCIATED WITH LOCK
KEY=(0000101000)
       IMS-NAME TRAN/JOB PSB-NAME DBD/PCB# PST#  RGN  CALL LOCK  LOCKFUNC STATE
WAITER IMSX     HPO7300R PSBHPO04 INDEXPCB 00001 BMP  ISRT GBIDP 22400318  06-P
BLCKER IMSX     HPO7300S PSBHPO04 -------- 00002 BMP  ---- ----- --------  06-P
```

# Apache Spark vs Pandas

## Spark

- Cluster computing framework
- Scalability
- Similar API to Pandas

## Pandas

- In-memory single server
- Dataframe concept
- Better performance in small scale
- More flexible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https://github.com/volov0/IMS-analytics

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# Thank You.