

# 实验1：mini-pixels环境部署和TPCH测试

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## 实验描述

本地部署 mini-pixel 开发环境，并对其进行TPCH测试。

## 实验过程

### 1. 准备实验代码：

```
# fork项目并clone代码
git clone https://github.com/Charles-T-T/mini-pixels.git
# 拉取submodule
cd mini-pixels
make pull
# 配置环境变量
echo 'export PIXELS_HOME=$PWD' >> ~/.bashrc
echo 'export PIXELS_SRC=$PWD' >> ~/.bashrc
source ~/.bashrc
# 编译
make -j$(nproc)
```

开发环境部署完毕：

```
[100%] Building CXX object examples/parquet-example/CMakeFiles/parquet-example.dir/main.cpp.o
[100%] Linking CXX executable parquet-example
gmake[3]: Leaving directory '/home/charles/study/db_dev/mini-pixels/build/release'
[100%] Built target parquet-example
gmake[2]: Leaving directory '/home/charles/study/db_dev/mini-pixels/build/release'
gmake[1]: Leaving directory '/home/charles/study/db_dev/mini-pixels/build/release'
charles@qllake:~/study/db_dev/mini-pixels$
```

### 2. 准备实验数据：

```
# 下载数据并解压
wget http://10.77.110.75/pixels/pixels-tpch-1.zip
unzip pixels-tpch-1.zip
# 修改测试数据路径为实际 mini-pixels路径
cd pixels-duckdb/benchmark/tpch/pixels/
vim pixels_tpch_template.benchmark.in
# in vim
:%s#/data/9a3-02/tpch-1#/home/charles/study/db_dev/mini-pixels#g
```

### 3. 进行TPCH测试（见实验结果）。

## 实验结果

### 1. 运行 pixels reader 测试：

```

charles@qllake:~/study/db_dev/mini-pixels$ ./build/release/examples/pixels-example/pixels-example
PIXELS_SRC is /home/charles/study/db_dev/mini-pixels
PIXELS_HOME is /home/charles/study/db_dev/mini-pixels
pixels properties file is /home/charles/study/db_dev/mini-pixels/pixels-cxx.properties
File not found at: /home/charles/study/db_dev/mini-pixels/cpp/tests/data/example.pxl
Trying alternative path...
id      name      birthday      score
BIGINT  VARCHAR  DATE          DECIMAL(15,2)
[ Rows: 10]
0       Tom       1996-03-13    90.60
1       Jerry    1998-01-01    10.10
2       Kitty    1997-12-12    20.40
3       Bob      2000-09-08    54.60
4       Alice    2009-05-25    100.01
5       Cat      1901-01-01    90.10
6       Danny    1987-04-23    87.60
7       Frank    1966-09-23    7.40
8       Liangyong 1998-11-19    100.00
9       Eric     1989-09-15    99.76

```

2. 执行一条查询:

```

charles@vmUbuntu:~/study/mini-pixels$ ./build/release/benchmark/benchmark_runner "benchmark/tpch/pixels/tpch_1/q01.benchmark"
name      run      timing
PIXELS_SRC is /home/charles/study/mini-pixels
PIXELS_HOME is /home/charles/study/mini-pixels
pixels properties file is /home/charles/study/mini-pixels/pixels-cxx.properties
NRuns: 1

benchmark/tpch/pixels/tpch_1/q01.benchmark      0
Result: 0.445109

```

3. 执行整个benchmark:

```
python3 run_benchmark_simple.py --dir benchmark/tpch/pixels/tpch_1/
```

```

(base0) charles@qllake:~/study/db_dev/mini-pixels/pixels-duckdb$ cat output/pixels_tpch_1.csv
Benchmark,Result
q01.benchmark,0.130544
q02.benchmark,0.022118
q03.benchmark,0.029724
q04.benchmark,0.017265
q05.benchmark,0.038584
q06.benchmark,0.051322
q07.benchmark,0.07798
q08.benchmark,0.022372
q09.benchmark,0.029121
q10.benchmark,0.021025
q11.benchmark,0.03663
q12.benchmark,0.163181
q13.benchmark,0.036268
q14.benchmark,0.079443
q15.benchmark,0.055975
q16.benchmark,0.047915
q17.benchmark,0.068497
q18.benchmark,0.047923
q19.benchmark,0.162732
q20.benchmark,0.028649
q21.benchmark,0.077918
q22.benchmark,0.055614

```

## 遇到的问题及解决方案

执行一条查询时, 出现报错:

```
DirectUringRandomAccessFile::RegisterBuffer: register buffer fails
```

查询资料得知这应该是在使用 `io_uring` (Linux 内核中一种较新的异步 I/O 接口) 进行高性能 I/O 操作时发生的。由于我的开发环境是 WSL2, 对此不完全兼容, 改为在虚拟机上操作, 成功解决。