postgreSQL中 json 和 jsonb 数据格式的性能分析

json 和 jsonb 存储量

自测使用java能够相对稳定写入数据的量(不准确), 两个应该相差不大

> jsonb: 41.92 MB = 42926.08kb json: 35.92 MB = 36782.08kb

索引SQL语法

```
CREATE INDEX UFriendsRelation_UFID_index ON "UFriendsRelation" ("UFID");
-- UFriendsRelation_UFID_index 是索引名称,默认小写,不分大小写
DROP INDEX test1_id_index;
```

#普通字段

性能测试

> 数据量 5102832, 510万

未建立索引测试:

```
-- 测试sql在不建立索引之前,查询耗时 2s382,2s382,2s348,2s403
select * from "UFriendsRelation" order by "UFID" desc limit 1;
-- 查询耗时 4s48,4s58,4s113,4.93s
select * from "UFriendsRelation" where "UFID" = (select Max("UFID") "UFID" from
"UFriendsRelation");
```

建立索引之后(UID建立索引)

```
--查询耗时 83ms, 87ms, 88ms, 87ms, 85ms, 80ms, 84ms
select * from "UFriendsRelation" order by "UFID" desc limit 1;
--查询耗时 95ms, 93ms, 76ms, 76ms, 77ms, 84ms, 85ms
select * from "UFriendsRelation" where "UFID" = (select Max("UFID") "UFID" from
"UFriendsRelation");
```

#json和jsonb字段 ###性能测试

> 数据量 5102832, 510万

- 未建立索引

```
-- 查询单条记录 98ms,94ms,88ms,96ms,92ms,95ms
select * from "UFriendsRelationT" where "UFID" = 3000000;
```

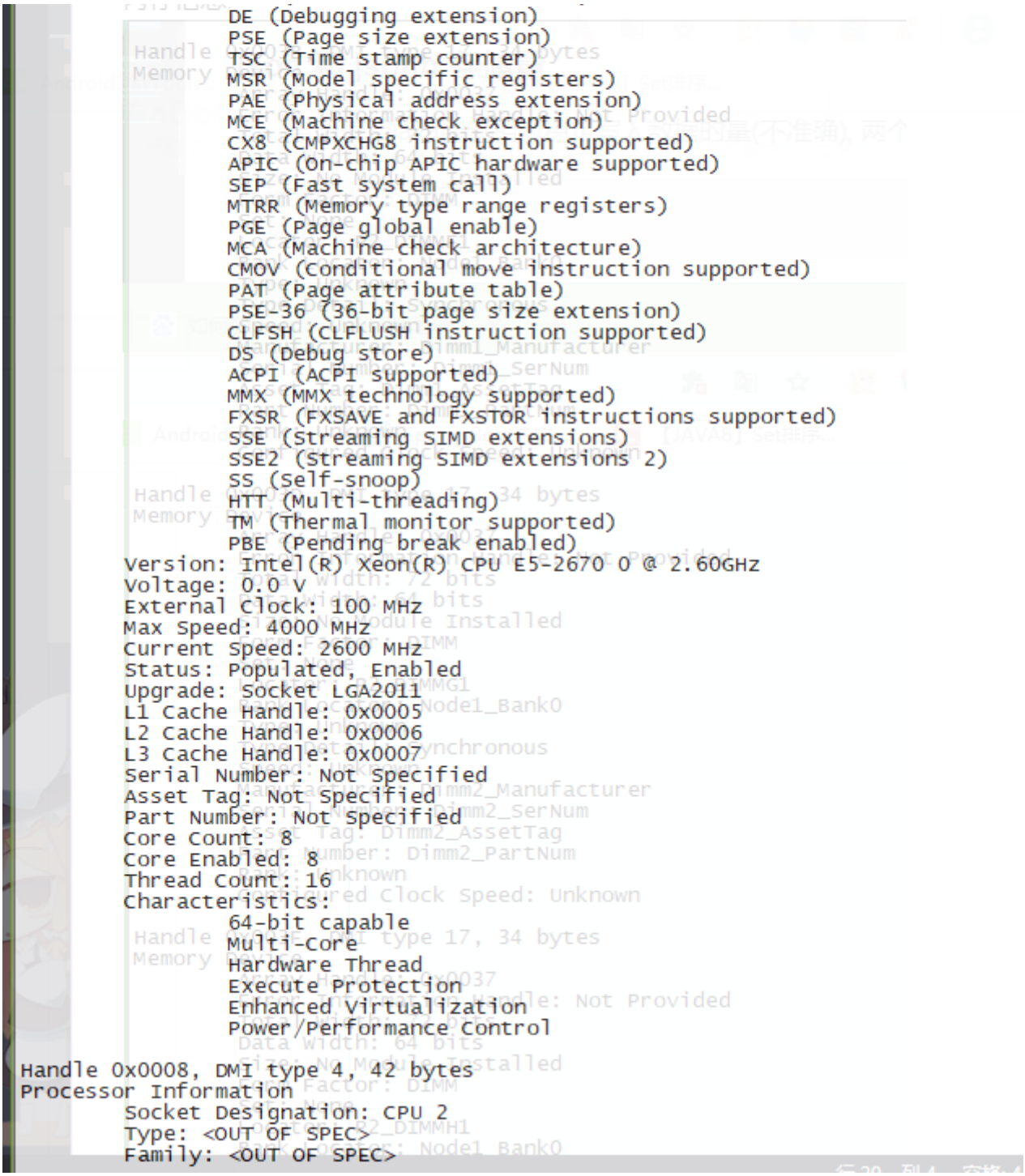
```
-- 更新jsonb,每次更新追加1000个对象 sql 测试 260ms,103ms,89ms,120ms,92ms
update "UFriendsRelationT" set "UFriends" = "UFriends"||'[{"age": 2, "sex": true,
"name": "格若曦"},...]' where "UFID" = 3000000;

-- 更新json,每次更新追加1000个对象 sql 测试 93ms,143ms,108ms,124ms,192ms
update "UFriendsRelationT" set "UGroupIds" = "UGroupIds"::jsonb||'[{"age": 2,
"sex": true, "name": "格若曦"},...]'::jsonb where "UFID" = 3000000;

-- 插入jsonb 每次插入1000个对象 测试 149ms,121ms,126ms,155ms,150ms,133ms
INSERT INTO "UFriendsRelationT" ("UHashId", "UFriends", "UFCreateTime") VALUES
('100a3999987', '[{"age": 10, "sex": true, "name": "第福气"},...]', '2020-05-07
06:57:45.431149');

-- 插入json 每次插入1000个对象 测试 117ms,130ms,104ms,112ms,104ms,120ms
INSERT INTO "UFriendsRelationT" ("UHashId", "UGroupIds", "UFCreateTime") VALUES
('100a3999987', '[{"age": 10, "sex": true, "name": "第福气"},...]', '2020-05-07
06:57:45.431149');

-- 全表扫描查询 jsonb 耗时 查了16m20s154ms
select count(1) from(
    select "UFID" from "UFriendsRelationT" where "UFriends" @> '[{"age": 33,
"sex": true, "name": "元xue_asdf"}]'::jsonb
                    )T1;
```

```
Handle 0x003B, DMI type 17, 34 bytes
Memory Device
        Array Handle: 0x0037
        Error Information Handle: Not Provided
        Total Width: 72 bits
        Data Width: 64 bits
        Size: No Module Installed
        Form Factor: DIMM
        Set: None
        Locator: P2_DIMMF1
        Bank Locator: Node1_Bank0
        Type: Unknown
        Type Detail: Synchronous
        Speed: Unknown
        Manufacturer: Dimm1_Manufacturer
        Serial Number: Dimm1_SerNum
        Asset Tag: Dimm1_AssetTag
        Part Number: Dimm1_PartNum
        Rank: Unknown
        Configured Clock Speed: Unknown

Handle 0x003D, DMI type 17, 34 bytes
Memory Device
        Array Handle: 0x0037
        Error Information Handle: Not Provided
        Total Width: 72 bits
        Data Width: 64 bits
        Size: No Module Installed
        Form Factor: DIMM
        Set: None
        Locator: P2_DIMMG1
        Bank Locator: Node1_Bank0
        Type: Unknown
        Type Detail: Synchronous
        Speed: Unknown
        Manufacturer: Dimm2_Manufacturer
        Serial Number: Dimm2_SerNum
        Asset Tag: Dimm2_AssetTag
        Part Number: Dimm2_PartNum
        Rank: Unknown
        Configured Clock Speed: Unknown

Handle 0x003F, DMI type 17, 34 bytes
Memory Device
        Array Handle: 0x0037
        Error Information Handle: Not Provided
        Total Width: 72 bits
        Data Width: 64 bits
        Size: No Module Installed
        Form Factor: DIMM
        Set: None
        Locator: P2_DIMMH1
        Bank Locator: Node1_Bank0
        Type: Unknown
        Type Detail: Synchronous
        Speed: Unknown
        Manufacturer: Dimm3_Manufacturer
        Serial Number: Dimm3_SerNum
        Asset Tag: Dimm3_AssetTag
        Part Number: Dimm3_PartNum
        Rank: Unknown
```

内存信息:

cup信息:

```
[root@xingshu ~]# dmidecode --type processor
# dmidecode 3.1
Getting SMBIOS data from sysfs.
SMBIOS 2.7 present.

Handle 0x0004, DMI type 4, 42 bytes
Processor Information
        Socket Designation: CPU 1
        Type: Central Processor
        Family: Xeon
        Manufacturer: Intel
        ID: D7 06 02 00 FF FB EB BF
        Signature: Type 0, Family 6, Model 45, Stepping 7
        Flags:
                FPU (Floating-point unit on-chip)
                VME (Virtual mode extension)
```



```
                DE (Debugging extension)
                PSE (Page size extension)
                TSC (Time stamp counter)
                MSR (Model specific registers)
                PAE (Physical address extension)
                MCE (Machine check exception)
                CX8 (CMPXCHG8 instruction supported)
                APIC (On-chip APIC hardware supported)
                SEP (Fast system call)
                MTRR (Memory type range registers)
                PGE (Page global enable)
                MCA (Machine check architecture)
                CMOV (Conditional move instruction supported)
                PAT (Page attribute table)
                PSE-36 (36-bit page size extension)
                CLFSH (CLFLUSH instruction supported)
                DS (Debug store)
                ACPI (ACPI supported)
                MMX (MMX technology supported)
                FXSR (FXSAVE and FXSTOR instructions supported)
                SSE (Streaming SIMD extensions)
                SSE2 (Streaming SIMD extensions 2)
                SS (Self-snoop)
                HTT (Multi-threading)
                TM (Thermal monitor supported)
                PBE (Pending break enabled)
        Version: Intel(R) Xeon(R) CPU E5-2670 0 @ 2.60GHz
        Voltage: 0.0 V
        External Clock: 100 MHz
        Max Speed: 4000 MHz
        Current Speed: 2600 MHz
        Status: Populated, Enabled
        Upgrade: Socket LGA2011
        L1 Cache Handle: 0x0005
        L2 Cache Handle: 0x0006
        L3 Cache Handle: 0x0007
        Serial Number: Not Specified
        Asset Tag: Not Specified
        Part Number: Not Specified
        Core Count: 8
        Core Enabled: 8
        Thread Count: 16
        Characteristics:
                64-bit capable
                Multi-Core
                Hardware Thread
                Execute Protection
                Enhanced Virtualization
                Power/Performance Control

Handle 0x0008, DMI type 4, 42 bytes
Processor Information
        Socket Designation: CPU 2
        Type: <OUT OF SPEC>
        Family: <OUT OF SPEC>
```