**图表

描述已自动生成**

**【客户名称】【Vastbase】数据库**

**健康巡检报告**

图片包含 游戏机, 盘子, 食物, 画

描述已自动生成

北京海量数据技术股份有限公司

20XX年XX月

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1. 概述及总结
   1. 概要

数据库在整个业务系统中处于非常核心的地位，数据库的性能好坏将直接影响到整个应用系统的性能。但往往在应用系统实际运行过程中，由于系统数据量的增加、业务模块应用逻辑的修改、应用版本变更、用户量增长等各种原因都可能使数据库性能下降，从而导致应用系统性能下降，影响用户感知。因此需要定期对数据库进行全面的性能分析，分析性能变化趋势及产生这些变化的原因，以便做出优化调整，保持应用系统良好的性能。

* 1. 巡检范围

|  |  |  |
| --- | --- | --- |
| **序号** | **数据库** | **数据库版本** |
| 1 | Vastbase |  |

* 1. 总结建议

|  |  |  |
| --- | --- | --- |
| **业务系统** | **分析项目** | **调整建议** |
| XXX管理系统 | 操作系统配置文件、静态配置信息 |  |
| Transparent Huge Pages |  |
| 数据库配置文件检查 |  |
| 数据库性能分析 |  |
| 数据库垃圾分析 |  |

1. 【Vastbase】数据库巡检
   1. 操作系统检查与分析结果

|  |  |  |
| --- | --- | --- |
| **栏目** | **状态** | **调整建议** |
| 操作系统配置文件、静态配置信息 |  |  |
| selinux 动态配置信息 |  |  |
| Transparent Huge Pages |  | s |

* + 1. 操作系统配置文件、静态配置信息

----->>>---->>> 主机名:

VM-16-10-centos

----->>>---->>> IP地址信息:

1: lo: ,UP,LOWER\_UP> mtu 65536 qdisc noqueue state UNKNOWN group default qlen 1000  
 link/loopback 00:00:00:00:00:00 brd 00:00:00:00:00:00  
 inet 127.0.0.1/8 scope host lo  
 valid\_lft forever preferred\_lft forever  
 inet6 ::1/128 scope host   
 valid\_lft forever preferred\_lft forever  
2: eth0: ,MULTICAST,UP,LOWER\_UP> mtu 1500 qdisc mq state UP group default qlen 1000  
 link/ether 52:54:00:74:7d:2d brd ff:ff:ff:ff:ff:ff  
 inet 10.0.16.10/22 brd 10.0.19.255 scope global eth0  
 valid\_lft forever preferred\_lft forever  
 inet6 fe80::5054:ff:fe74:7d2d/64 scope link   
 valid\_lft forever preferred\_lft forever

--------- 操作系统内核:

Linux VM-16-10-centos 3.10.0-1160.11.1.el7.x86\_64 #1 SMP Fri Dec 18 16:34:56 UTC 2020 x86\_64 x86\_64 x86\_64 GNU/Linux

--------- 内存(MB):

total used free shared buff/cache available  
Mem: 3789 745 208 2180 2835 624  
Swap: 0 0 0

--------- CPU:

Architecture: x86\_64  
CPU op-mode(s): 32-bit, 64-bit  
Byte Order: Little Endian  
CPU(s): 2  
On-line CPU(s) list: 0,1  
Thread(s) per core: 1  
Core(s) per socket: 2  
Socket(s): 1  
NUMA node(s): 1  
Vendor ID: AuthenticAMD  
CPU family: 23  
Model: 49  
Model name: AMD EPYC 7K62 48-Core Processor  
Stepping: 0  
CPU MHz: 2595.124  
BogoMIPS: 5190.24  
Hypervisor vendor: KVM  
Virtualization type: full  
L1d cache: 32K  
L1i cache: 32K  
L2 cache: 4096K  
L3 cache: 16384K  
NUMA node0 CPU(s): 0,1  
Flags: fpu vme de pse tsc msr pae mce cx8 apic sep mtrr pge mca cmov pat pse36 clflush mmx fxsr sse sse2 ht syscall nx mmxext fxsr\_opt pdpe1gb rdtscp lm art rep\_good nopl extd\_apicid eagerfpu pni pclmulqdq ssse3 fma cx16 sse4\_1 sse4\_2 x2apic movbe popcnt aes xsave avx f16c rdrand hypervisor lahf\_lm cmp\_legacy cr8\_legacy abm sse4a misalignsse 3dnowprefetch osvw topoext retpoline\_amd ibpb vmmcall fsgsbase bmi1 avx2 smep bmi2 rdseed adx smap clflushopt xsaveopt xsavec xgetbv1 arat

--------- 操作系统配置文件、静态配置信息:

--------- /etc/sysctl.conf :

net.ipv4.ip\_forward = 0  
net.ipv4.conf.default.rp\_filter = 1  
net.ipv4.conf.default.accept\_source\_route = 0  
kernel.core\_uses\_pid = 1  
net.ipv4.tcp\_syncookies = 1  
kernel.msgmnb = 65536  
kernel.msgmax = 65536  
net.ipv4.conf.all.promote\_secondaries = 1  
net.ipv4.conf.default.promote\_secondaries = 1  
net.ipv6.neigh.default.gc\_thresh3 = 4096   
net.ipv4.neigh.default.gc\_thresh3 = 4096  
kernel.softlockup\_panic = 1  
kernel.sysrq = 1  
net.ipv6.conf.all.disable\_ipv6=0  
net.ipv6.conf.default.disable\_ipv6=0  
net.ipv6.conf.lo.disable\_ipv6=0  
kernel.numa\_balancing = 0

--------- /etc/security/limits.conf :

rolname | rolconnlimit | connects   
----------+--------------+----------  
 vastbase | -1 | 5  
 vbadmin | -1 | 1  
(2 rows)

--------- 磁盘空间：

Filesystem Size Used Avail Use% Mounted on  
devtmpfs 1.9G 0 1.9G 0% /dev  
tmpfs 1.9G 96K 1.9G 1% /dev/shm  
tmpfs 1.9G 584K 1.9G 1% /run  
tmpfs 1.9G 0 1.9G 0% /sys/fs/cgroup  
/dev/vda1 79G 11G 65G 15% /  
tmpfs 379M 0 379M 0% /run/user/0

建议:

* + 1. selinux 动态配置信息

--------- selinux 动态配置信息:

SELinux status: disabled

建议:

* + 1. Transparent Huge Pages

--------- 建议禁用Transparent Huge Pages (THP):

[always] madvise never  
[always] madvise never

建议:

* 1. 数据库运行结果

|  |  |  |
| --- | --- | --- |
| **栏目** | **状态** | **调整建议** |
| 配置文件检查 |  |  |
| 用户或数据库级别定制参数 |  |  |
| 数据库错误日志 |  |  |
| 数据库空间使用分析 |  |  |
| 数据库连接分析 |  |  |
| 数据库性能分析 |  |  |
| 数据库垃圾分析 |  |  |
| 数据库年龄分析 |  |  |
| 数据库XLOG, 流复制状态分析 |  |  |
| 数据库安全或潜在风险分析 |  |  |
| 重置统计信息 |  |  |

* + 1. **数据库信息**

--------- 数据库版本:

version   
----------------------------------------------------------------------------------------------------------------------------------------------------------------------------  
 PostgreSQL 9.2.4 (Vastbase G100 V2.2 (Build 5.8.3547)) compiled at 2021-10-14 15:46:14 commit 0 last mr on x86\_64-unknown-linux-gnu, compiled by g++ (GCC) 7.3.0, 64-bit  
(1 row)

--------- 用户已安装的插件版本:

current\_database | extname | extowner | extnamespace | extrelocatable | extversion | extconfig | extcondition   
------------------+-----------------+----------+--------------+----------------+------------+-----------+--------------  
 cicgroup | plpgsql | 10 | 11 | f | 1.0 | |   
 cicgroup | mot\_fdw | 10 | 11 | t | 1.0 | |   
 cicgroup | file\_fdw | 10 | 11 | t | 1.0 | |   
 cicgroup | security\_plugin | 10 | 11 | t | 1.0 | |   
 cicgroup | pg\_zhtrgm | 10 | 11 | t | 1.0 | |   
(5 rows)  
  
 current\_database | extname | extowner | extnamespace | extrelocatable | extversion | extconfig | extcondition   
------------------+--------------------+----------+--------------+----------------+------------+-----------+--------------  
 vastbase | plpgsql | 10 | 11 | f | 1.0 | |   
 vastbase | mot\_fdw | 10 | 11 | t | 1.0 | |   
 vastbase | file\_fdw | 10 | 11 | t | 1.0 | |   
 vastbase | security\_plugin | 10 | 11 | t | 1.0 | |   
 vastbase | pg\_zhtrgm | 10 | 11 | t | 1.0 | |   
 vastbase | pg\_stat\_statements | 10 | 2200 | t | 1.1 | |   
(6 rows)  
  
 current\_database | extname | extowner | extnamespace | extrelocatable | extversion | extconfig | extcondition   
------------------+-----------------+----------+--------------+----------------+------------+-----------+--------------  
 postgres | plpgsql | 10 | 11 | f | 1.0 | |   
 postgres | mot\_fdw | 10 | 11 | t | 1.0 | |   
 postgres | file\_fdw | 10 | 11 | t | 1.0 | |   
 postgres | security\_plugin | 10 | 11 | t | 1.0 | |   
 postgres | pg\_zhtrgm | 10 | 11 | t | 1.0 | |   
(5 rows)

--------- 用户使用了多少种数据类型:

current\_database | typname | count   
------------------+-------------+-------  
 cicgroup | int8 | 1006  
 cicgroup | varchar | 766  
 cicgroup | text | 510  
 cicgroup | numeric | 428  
 cicgroup | int4 | 290  
 cicgroup | name | 286  
 cicgroup | oid | 117  
 cicgroup | timestamptz | 104  
 cicgroup | bpchar | 39  
 cicgroup | bool | 38  
 cicgroup | xid | 35  
 cicgroup | float8 | 30  
 cicgroup | timestamp | 23  
 cicgroup | int2 | 21  
 cicgroup | cid | 14  
 cicgroup | inet | 10  
 cicgroup | tid | 7  
 cicgroup | rowid | 7  
 cicgroup | raw | 6  
 cicgroup | int1 | 3  
 cicgroup | char | 2  
 cicgroup | \_text | 2  
 cicgroup | bytea | 1  
(23 rows)  
  
 current\_database | typname | count   
------------------+-------------+-------  
 vastbase | int8 | 994  
 vastbase | varchar | 779  
 vastbase | text | 552  
 vastbase | numeric | 429  
 vastbase | int4 | 297  
 vastbase | name | 282  
 vastbase | oid | 120  
 vastbase | timestamptz | 110  
 vastbase | bpchar | 40  
 vastbase | xid | 37  
 vastbase | float8 | 33  
 vastbase | bool | 31  
 vastbase | timestamp | 24  
 vastbase | int2 | 21  
 vastbase | cid | 16  
 vastbase | inet | 10  
 vastbase | rowid | 8  
 vastbase | tid | 8  
 vastbase | raw | 6  
 vastbase | int1 | 3  
 vastbase | \_text | 2  
 vastbase | char | 2  
 vastbase | bytea | 1  
(23 rows)  
  
 current\_database | typname | count   
------------------+-------------+-------  
 postgres | int8 | 1319  
 postgres | varchar | 764  
 postgres | text | 613  
 postgres | numeric | 499  
 postgres | int4 | 376  
 postgres | name | 349  
 postgres | oid | 193  
 postgres | xid | 159  
 postgres | timestamptz | 130  
 postgres | cid | 126  
 postgres | tid | 63  
 postgres | rowid | 63  
 postgres | float8 | 40  
 postgres | bpchar | 40  
 postgres | bool | 37  
 postgres | timestamp | 23  
 postgres | int2 | 22  
 postgres | inet | 11  
 postgres | cstring | 10  
 postgres | raw | 6  
 postgres | int1 | 5  
 postgres | \_text | 3  
 postgres | char | 2  
 postgres | bytea | 1  
(24 rows)

--------- 用户创建了多少对象:

current\_database | rolname | nspname | relkind | count   
------------------+----------+------------+---------+-------  
 cicgroup | vastbase | dbe\_perf | v | 173  
 cicgroup | vastbase | sys | v | 64  
 cicgroup | grp\_nd | grp\_nd | S | 4  
 cicgroup | vastbase | utl\_file | r | 1  
 cicgroup | vbaudit | audit | f | 1  
 cicgroup | vastbase | dbms\_xplan | v | 1  
 cicgroup | vastbase | public | v | 1  
 cicgroup | grp\_nd | grp\_nd | r | 1  
 cicgroup | vastbase | dbms\_pipe | v | 1  
(9 rows)  
  
 current\_database | rolname | nspname | relkind | count   
------------------+----------+------------+---------+-------  
 vastbase | vastbase | dbe\_perf | v | 173  
 vastbase | vastbase | sys | v | 64  
 vastbase | vastbase | public | r | 6  
 vastbase | vastbase | public | v | 2  
 vastbase | vastbase | dbms\_xplan | v | 1  
 vastbase | vastbase | dbms\_pipe | v | 1  
 vastbase | vbaudit | audit | f | 1  
 vastbase | vastbase | utl\_file | r | 1  
(8 rows)  
  
 current\_database | rolname | nspname | relkind | count   
------------------+----------+------------+---------+-------  
 postgres | vastbase | dbe\_perf | v | 173  
 postgres | vastbase | sys | v | 64  
 postgres | vastbase | snapshot | r | 60  
 postgres | vastbase | snapshot | i | 5  
 postgres | vastbase | public | v | 1  
 postgres | vastbase | snapshot | S | 1  
 postgres | vbaudit | audit | f | 1  
 postgres | vastbase | dbms\_xplan | v | 1  
 postgres | vastbase | dbms\_pipe | v | 1  
 postgres | vastbase | utl\_file | r | 1  
(10 rows)

--------- 用户对象占用空间的柱状图:

current\_database | this\_buk\_no | rels\_in\_this\_buk | buk\_min | buk\_max   
------------------+-------------+------------------+------------+------------  
 cicgroup | 1 | 242 | 0 bytes | 0 bytes  
 cicgroup | 2 | 4 | 8192 bytes | 8192 bytes  
 cicgroup | 10 | 1 | 56 kB | 56 kB  
(3 rows)  
  
 current\_database | this\_buk\_no | rels\_in\_this\_buk | buk\_min | buk\_max   
------------------+-------------+------------------+---------+---------  
 vastbase | 1 | 248 | 0 bytes | 48 kB  
 vastbase | 10 | 1 | 12 MB | 12 MB  
(2 rows)  
  
 current\_database | this\_buk\_no | rels\_in\_this\_buk | buk\_min | buk\_max   
------------------+-------------+------------------+---------+---------  
 postgres | 1 | 292 | 0 bytes | 1456 kB  
 postgres | 2 | 3 | 2552 kB | 3736 kB  
 postgres | 3 | 2 | 6120 kB | 6144 kB  
 postgres | 5 | 2 | 9080 kB | 9608 kB  
 postgres | 6 | 2 | 11 MB | 11 MB  
 postgres | 7 | 1 | 13 MB | 13 MB  
 postgres | 8 | 2 | 15 MB | 15 MB  
 postgres | 9 | 1 | 17 MB | 17 MB  
 postgres | 10 | 3 | 19 MB | 21 MB  
(9 rows)

建议:

* + 1. 配置文件检查

--------- 获取pg\_hba.conf md5值:

21d74713ad661e1955ba022efdcb3231 /home/vastbase/data/pg\_hba.conf

建议: 主备md5值一致(判断主备配置文件是否内容一致的一种手段, 或者使用diff).

--------- 获取pg\_hba.conf配置:

local all all trust  
host all all 127.0.0.1/32 trust  
host all all ::1/128 trust  
host all all 0.0.0.0/0 md5  
建议:   
 主备配置尽量保持一致, 注意trust和password认证方法的危害(password方法 验证时网络传输密码明文, 建议改为md5), 建议除了unix socket可以使用trust以外, 其他都使用md5或者LDAP认证方法.  
 建议先设置白名单(超级用户允许的来源IP, 可以访问的数据库), 再设置黑名单(不允许超级用户登陆, reject), 再设置白名单(普通应用), 参考pg\_hba.conf中的描述.

建议:

主备配置尽量保持一致, 注意trust和password认证方法的危害(password方法 验证时网络传输密码明文, 建议改为md5), 建议除了unix socket可以使用trust以外, 其他都使用md5或者LDAP认证方法.

建议先设置白名单(超级用户允许的来源IP, 可以访问的数据库), 再设置黑名单(不允许超级用户登陆, reject), 再设置白名单(普通应用), 参考pg\_hba.conf中的描述.

--------- 获取postgresql.conf md5值:

40ccf387d6e3b505d26c04b12882a00a /home/vastbase/data/postgresql.conf

建议:

主备md5值一致(判断主备配置文件是否内容一致的一种手段, 或者使用diff).

--------- 获取postgresql.conf配置:

port = 5432   
max\_connections = 200   
session\_timeout = 10min   
shared\_buffers = 32MB   
bulk\_write\_ring\_size = 2GB   
max\_prepared\_transactions = 200   
cstore\_buffers = 512MB   
wal\_level = hot\_standby   
enable\_incremental\_checkpoint = on   
incremental\_checkpoint\_timeout = 60s   
max\_wal\_senders = 4   
wal\_keep\_segments = 16   
enable\_slot\_log = off  
max\_replication\_slots = 8   
synchronous\_standby\_names = '\*'   
walsender\_max\_send\_size = 8MB   
hot\_standby = on   
enable\_kill\_query = off   
logging\_collector = on   
log\_filename = 'postgresql-%Y-%m-%d\_%H%M%S.log'   
log\_file\_mode = 0600   
log\_rotation\_size = 20MB   
log\_min\_duration\_statement = 1800000   
log\_connections = off   
log\_disconnections = off   
log\_duration = on   
log\_hostname = on   
log\_line\_prefix = '%m %u %d %h %p %S '   
log\_statement = 'all'   
log\_timezone = 'PRC'  
vastbase\_login\_info = off   
enable\_alarm = on  
connection\_alarm\_rate = 0.9  
alarm\_report\_interval = 10  
alarm\_component = '/opt/snas/bin/snas\_cm\_cmd'  
use\_workload\_manager = on   
datestyle = 'iso, mdy'  
timezone = 'PRC'  
lc\_messages = 'en\_US.utf8'   
lc\_monetary = 'en\_US.utf8'   
lc\_numeric = 'en\_US.utf8'   
lc\_time = 'en\_US.utf8'   
default\_text\_search\_config = 'pg\_catalog.english'  
lockwait\_timeout = 1200s   
pgxc\_node\_name = 'node1'   
audit\_enabled = on  
job\_queue\_processes = 10   
default\_storage\_nodegroup = 'installation'   
expected\_computing\_nodegroup = 'query'   
license\_path='/home/vastbase/ZHRSLlicense'  
listen\_addresses='\*'  
port=5432  
max\_connections = 1024  
session\_timeout = 0  
client\_min\_messages = warning  
log\_min\_messages = warning  
log\_destination = 'stderr,csvlog'  
log\_error\_verbosity = 'verbose'  
logging\_collector = on  
log\_filename = 'postgresql-%Y-%m-%d.log'  
log\_file\_mode = 0600   
log\_rotation\_size = 0   
log\_min\_duration\_statement = 10000   
log\_connections = on   
log\_disconnections = on   
log\_duration = off  
log\_hostname = on   
log\_line\_prefix = '%t [%p]: user=%u,db=%d,app=%a,client=%h '   
log\_timezone = 'PRC'  
log\_error\_verbosity=terse  
track\_activities = on  
enable\_instr\_track\_wait = on  
enable\_instr\_rt\_percentile = off  
track\_counts = on  
track\_sql\_count = off  
enable\_instr\_cpu\_timer = off  
enable\_instance\_metric\_persistent = off  
enable\_logical\_io\_statistics = off  
enable\_page\_lsn\_check = off  
enable\_user\_metric\_persistent = off  
enable\_resource\_track = off  
instr\_unique\_sql\_count=0  
plog\_merge\_age = 0  
shared\_buffers = 247MB   
work\_mem =128MB  
cstore\_buffers = 16MB   
max\_files\_per\_process = 100000  
max\_prepared\_transactions = 2048  
enable\_thread\_pool = on  
wal\_level = logical  
wal\_log\_hints = on  
advance\_xlog\_file\_num = 10  
wal\_buffers = 1GB  
xloginsert\_locks = 48  
enable\_xlog\_prune = off  
max\_wal\_senders = 10  
max\_replication\_slots = 8  
synchronous\_commit=on  
enable\_mergejoin = on  
enable\_nestloop = on  
enable\_hashjoin = on  
enable\_bitmapscan = on  
enable\_material = off  
enable\_codegen = false  
enable\_opfusion = off  
enable\_beta\_opfusion=off  
query\_dop=1  
effective\_cache\_size=2GB  
autovacuum = on  
autovacuum\_mode = mix  
autovacuum\_max\_workers = 10  
autovacuum\_naptime = 20s  
autovacuum\_vacuum\_cost\_delay = 10   
autovacuum\_vacuum\_scale\_factor = 0.02  
autovacuum\_analyze\_scale\_factor = 0.1  
enable\_save\_datachanged\_timestamp = false  
vacuum\_cost\_limit = 10000  
autoanalyze\_timeout=900  
enable\_incremental\_checkpoint = on  
incremental\_checkpoint\_timeout = 60s  
checkpoint\_segments = 1024  
checkpoint\_timeout = 60min   
checkpoint\_completion\_target = 0.9  
checkpoint\_warning = 5min  
checkpoint\_wait\_timeout = 60s  
hot\_standby = on  
replication\_type=1  
recovery\_max\_workers=8  
recovery\_parallelism=1  
recovery\_parse\_workers=1  
recovery\_redo\_workers=1  
recovery\_time\_target=0  
fsync = on   
full\_page\_writes = off  
enable\_double\_write = on  
allow\_concurrent\_tuple\_update = true  
enable\_alarm = off  
use\_workload\_manager = off  
transaction\_isolation = 'read committed'  
default\_transaction\_isolation = 'read committed'  
update\_lockwait\_timeout = 20min  
pagewriter\_sleep = 5ms  
log\_statement = 'all'  
track\_io\_timing = on   
track\_activity\_query\_size = 2048   
wal\_keep\_segments = 1000  
enable\_wdr\_snapshot=on  
password\_reuse\_max = 1  
failed\_login\_attempts = 15  
password\_effect\_time = 36500  
建议:   
 主备配置尽量保持一致, 配置合理的参数值.  
 建议修改的参数列表如下 ( 假设操作系统内存为512GB, 数据库独占操作系统, 数据库版本v2.2.4, 其他版本可能略有不同, 未来再更新进来 ) :  
#证书路径  
license\_path = '请输入licence绝对路径/licence名称'  
vastbase\_login\_info = off  
  
#监听信息  
listen\_addresses = '\*'  
port = 5432  
max\_connections = 2000  
session\_timeout = 10min  
  
#日志  
client\_min\_messages = warning   
log\_min\_messages = warning  
log\_destination = 'stderr'  
logging\_collector = on   
#log\_directory = 'pg\_log'   
log\_filename = 'postgresql-%Y-%m-%d\_%H%M%S.log'   
log\_rotation\_size = 50MB   
log\_duration = off   
track\_activities = on  
enable\_instr\_track\_wait = on  
enable\_instr\_rt\_percentile = off  
track\_counts = on  
track\_sql\_count = off  
enable\_instr\_cpu\_timer = off  
enable\_instance\_metric\_persistent = off  
enable\_logical\_io\_statistics = off  
enable\_page\_lsn\_check = off  
enable\_user\_metric\_persistent = off  
enable\_resource\_track = off  
instr\_unique\_sql\_count = 0  
plog\_merge\_age = 0  
  
#内存资源调整  
shared\_buffers = 204GB  
max\_process\_memory = 409GB  
work\_mem = 48MB  
cstore\_buffers = 16MB  
maintenance\_work\_mem = 20GB  
max\_files\_per\_process = 100000   
max\_prepared\_transactions = 2048  
bulk\_write\_ring\_size = 2GB  
  
#WAL配置  
wal\_level = hot\_standby  
wal\_log\_hints = on  
advance\_xlog\_file\_num = 10  
wal\_buffers = 1GB  
xloginsert\_locks = 48  
enable\_xlog\_prune = off  
max\_wal\_senders = 4  
wal\_keep\_segments = 16  
max\_replication\_slots = 8  
synchronous\_commit = on  
  
#执行计划  
enable\_mergejoin = on  
enable\_nestloop = on  
enable\_hashjoin = on  
enable\_bitmapscan = on  
enable\_material = off  
enable\_codegen = false  
enable\_opfusion = off  
enable\_beta\_opfusion = off  
query\_dop = 1  
  
#autovacuum  
autovacuum = on  
autovacuum\_mode = vacuum  
autovacuum\_max\_workers = 10  
autovacuum\_naptime = 20s  
autovacuum\_vacuum\_cost\_delay = 10  
autovacuum\_vacuum\_scale\_factor = 0.02  
autovacuum\_analyze\_scale\_factor = 0.1  
enable\_save\_datachanged\_timestamp = false  
vacuum\_cost\_limit = 10000  
autoanalyze\_timeout = 900  
  
#增量检查点信息  
enable\_incremental\_checkpoint = on  
incremental\_checkpoint\_timeout = 60s  
checkpoint\_segments = 1024  
checkpoint\_timeout = 15min  
checkpoint\_completion\_target = 0.9  
checkpoint\_warning = 5min  
checkpoint\_wait\_timeout = 60s  
  
#归档信息  
archive\_mode = off  
archive\_command = '/bin/bash /home/vb24/vb\_archive.sh %p %f'  
archive\_dest = '/data/archive'  
  
#主备信息  
application\_name = 'vdb'  
password\_encryption\_type = 0  
#replconninfo1 = 'localhost=172.20.20.92 localport=26002 localheartbeatport=26005 localservice=26004 remotehost =172.20.20.88 remoteport=26002 remoteheartbeatport=26005 remoteservice=26004'  
synchronous\_standby\_names = '\*'  
most\_available\_sync = on  
remote\_read\_mode = non\_authentication  
hot\_standby\_feedback = off  
enable\_data\_replicate = off  
  
#并行回放/极致RTO  
# 以下为并行回放的参数配置：  
hot\_standby = off  
replication\_type = 1  
recovery\_max\_workers = 8  
recovery\_parallelism = 1  
recovery\_parse\_workers = 1  
recovery\_redo\_workers = 1  
recovery\_time\_target = 0  
  
#审计日志配置  
audit\_enabled = off  
audit\_operation\_result = 0  
#其他  
fsync = on  
full\_page\_writes = off  
enable\_double\_write = on  
allow\_concurrent\_tuple\_update = true  
enable\_alarm = off  
use\_workload\_manager = off  
transaction\_isolation = 'read committed'  
default\_transaction\_isolation = 'read committed'  
update\_lockwait\_timeout = 20min  
pagewriter\_sleep = 5ms  
  
  
#线程池  
enable\_thread\_pool = off  
numa\_distribute\_mode = 'none'  
thread\_pool\_attr = '494,4,(allbind)'  
wal\_writer\_cpu = 0  
  
#default  
session\_timeout = 10min  
enable\_slot\_log = off  
walsender\_max\_send\_size = 8MB  
enable\_kill\_query = off  
log\_file\_mode = 0600  
log\_min\_duration\_statement = 1800000  
log\_connections = off  
log\_disconnections = off  
log\_hostname = on  
log\_line\_prefix = '%m %u %d %h %p %S '  
log\_timezone = 'PRC'  
connection\_alarm\_rate = 0.9  
alarm\_report\_interval = 10  
alarm\_component = '/opt/snas/bin/snas\_cm\_cmd'  
datestyle = 'iso, mdy'  
timezone = 'PRC'  
lc\_messages = 'en\_US.UTF-8'  
lc\_monetary = 'en\_US.UTF-8'  
lc\_numeric = 'en\_US.UTF-8'  
lc\_time = 'en\_US.UTF-8'  
default\_text\_search\_config = 'pg\_catalog.english'  
lockwait\_timeout = 1200s  
pgxc\_node\_name = 'vdb'  
job\_queue\_processes = 10  
default\_storage\_nodegroup = 'installation'  
expected\_computing\_nodegroup = 'query'

建议:

建议修改的参数列表如下:

* + 1. 用户或数据库级别定制参数

--------- 用户或数据库级别定制参数:

setdatabase | setrole | setconfig   
-------------+---------+-----------  
(0 rows)

建议:

* + 1. 数据库错误日志分析

--------- 获取错误日志信息:

--------- 获取连接请求情况:

--------- 获取认证失败情况:

建议：

当前系统运行正常，建议继续保持

* + 1. 数据库空间使用分析

--------- 输出表空间对应目录:

total 8  
drwx------ 2 vastbase vastbase 4096 Dec 2 11:07 .  
drwx------ 25 vastbase vastbase 4096 Dec 8 23:20 ..

建议:

注意表空间如果不是软链接, 注意是否刻意所为, 正常情况下应该是软链接.

--------- 输出表空间使用情况:

spcname | pg\_tablespace\_location | pg\_size\_pretty   
------------+------------------------+----------------  
 pg\_global | | 514 MB  
 pg\_default | | 284 MB  
(2 rows)

建议:

注意检查表空间所在文件系统的剩余空间。

--------- 输出数据库使用情况:

datname | pg\_size\_pretty   
-----------+----------------  
 postgres | 217 MB  
 vastbase | 26 MB  
 cicgroup | 14 MB  
 template1 | 13 MB  
 template0 | 13 MB  
(5 rows)

建议:

注意检查数据库的大小, 是否需要清理历史数据.

--------- TOP 10 size对象:

current\_database | nspname | relname | relkind | pg\_size\_pretty | seq\_scan | seq\_tup\_read | idx\_scan | idx\_tup\_fetch | n\_tup\_ins | n\_tup\_upd | n\_tup\_del | n\_tup\_hot\_upd | n\_live\_tup | n\_dead\_tup   
------------------+------------+----------------+---------+----------------+----------+--------------+----------+---------------+-----------+-----------+-----------+---------------+------------+------------  
 cicgroup | pg\_catalog | pg\_attribute | r | 2064 kB | 1 | 10865 | 1102 | 4649 | 0 | 0 | 0 | 0 | 0 | 0  
 cicgroup | pg\_catalog | pg\_proc | r | 944 kB | 0 | 0 | 20 | 69 | 0 | 0 | 0 | 0 | 0 | 0  
 cicgroup | pg\_catalog | pg\_depend | r | 584 kB | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0  
 cicgroup | pg\_catalog | pg\_class | r | 416 kB | 24 | 17351 | 835 | 588 | 0 | 0 | 0 | 0 | 0 | 0  
 cicgroup | pg\_catalog | pg\_rewrite | r | 392 kB | 0 | 0 | 245 | 255 | 0 | 0 | 0 | 0 | 0 | 0  
 cicgroup | pg\_catalog | pg\_collation | r | 232 kB | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0  
 cicgroup | pg\_catalog | pg\_statistic | r | 184 kB | 0 | 0 | 30 | 23 | 0 | 0 | 0 | 0 | 0 | 0  
 cicgroup | pg\_catalog | pg\_type | r | 184 kB | 1 | 872 | 69 | 67 | 0 | 0 | 0 | 0 | 0 | 0  
 cicgroup | pg\_catalog | pg\_description | r | 144 kB | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0  
 cicgroup | pg\_catalog | pg\_operator | r | 120 kB | 0 | 0 | 63 | 82 | 0 | 0 | 0 | 0 | 0 | 0  
(10 rows)  
  
 current\_database | nspname | relname | relkind | pg\_size\_pretty | seq\_scan | seq\_tup\_read | idx\_scan | idx\_tup\_fetch | n\_tup\_ins | n\_tup\_upd | n\_tup\_del | n\_tup\_hot\_upd | n\_live\_tup | n\_dead\_tup   
------------------+------------+----------------+---------+----------------+----------+--------------+----------+---------------+-----------+-----------+-----------+---------------+------------+------------  
 vastbase | public | error\_log | r | 12 MB | 0 | 0 | | | 0 | 0 | 0 | 0 | 0 | 0  
 vastbase | pg\_catalog | pg\_attribute | r | 2120 kB | 1 | 10964 | 1169 | 4920 | 0 | 0 | 0 | 0 | 0 | 0  
 vastbase | pg\_catalog | pg\_proc | r | 952 kB | 0 | 0 | 34 | 83 | 0 | 0 | 0 | 0 | 0 | 0  
 vastbase | pg\_catalog | pg\_depend | r | 584 kB | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0  
 vastbase | pg\_catalog | pg\_class | r | 416 kB | 24 | 17518 | 930 | 681 | 0 | 0 | 0 | 0 | 0 | 0  
 vastbase | pg\_catalog | pg\_rewrite | r | 392 kB | 0 | 0 | 255 | 283 | 0 | 0 | 0 | 0 | 0 | 0  
 vastbase | pg\_catalog | pg\_statistic | r | 256 kB | 0 | 0 | 37 | 27 | 0 | 0 | 0 | 0 | 0 | 0  
 vastbase | pg\_catalog | pg\_collation | r | 232 kB | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0  
 vastbase | pg\_catalog | pg\_type | r | 184 kB | 1 | 883 | 123 | 119 | 0 | 0 | 0 | 0 | 0 | 0  
 vastbase | pg\_catalog | pg\_description | r | 144 kB | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0  
(10 rows)  
  
 current\_database | nspname | relname | relkind | pg\_size\_pretty | seq\_scan | seq\_tup\_read | idx\_scan | idx\_tup\_fetch | n\_tup\_ins | n\_tup\_upd | n\_tup\_del | n\_tup\_hot\_upd | n\_live\_tup | n\_dead\_tup   
------------------+------------+---------------------------------+---------+----------------+----------+--------------+----------+---------------+-----------+-----------+-----------+---------------+------------+------------  
 postgres | snapshot | snap\_global\_stat\_all\_indexes | r | 21 MB | 0 | 0 | | | 0 | 0 | 0 | 0 | 0 | 0  
 postgres | snapshot | snap\_class\_vital\_info | r | 20 MB | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0  
 postgres | snapshot | snap\_global\_statio\_all\_indexes | r | 19 MB | 0 | 0 | | | 0 | 0 | 0 | 0 | 0 | 0  
 postgres | snapshot | snap\_global\_stat\_all\_tables | r | 17 MB | 0 | 0 | | | 0 | 0 | 0 | 0 | 0 | 0  
 postgres | snapshot | snap\_summary\_stat\_all\_indexes | r | 15 MB | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0  
 postgres | snapshot | snap\_summary\_statio\_all\_indexes | r | 15 MB | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0  
 postgres | snapshot | snap\_global\_statio\_all\_tables | r | 13 MB | 0 | 0 | | | 0 | 0 | 0 | 0 | 0 | 0  
 postgres | pg\_catalog | gs\_asp | r | 12 MB | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0  
 postgres | snapshot | snap\_global\_config\_settings | r | 11 MB | 0 | 0 | | | 0 | 0 | 0 | 0 | 0 | 0  
 postgres | snapshot | snap\_summary\_stat\_all\_tables | r | 11 MB | 0 | 0 | | | 0 | 0 | 0 | 0 | 0 | 0  
(10 rows)

建议:

经验值: 单表超过8GB, 并且这个表需要频繁更新 或 删除+插入的话, 建议对表根据业务逻辑进行合理拆分后获得更好的性能, 以及便于对膨胀索引进行维护; 如果是只读的表, 建议适当结合SQL语句进行优化.

* + 1. 数据库连接分析

--------- 当前活跃度:

now | state | count   
-------------------------------+--------+-------  
 2021-12-10 14:45:57.672768+08 | active | 4  
 2021-12-10 14:45:57.672768+08 | idle | 2  
(2 rows)

建议:

如果active状态很多, 说明数据库比较繁忙. 如果idle in transaction很多, 说明业务逻辑设计可能有问题. 如果idle很多, 可能使用了连接池, 并且可能没有自动回收连接到连接池的最小连接数.

--------- 总剩余连接数:

max\_conn | used | res\_for\_normal   
----------+------+----------------  
 1024 | 6 | 1012  
(1 row)

建议:

给超级用户和普通用户设置足够的连接, 以免不能登录数据库.

--------- 用户连接数限制:

rolname | rolconnlimit | connects   
----------+--------------+----------  
 vastbase | -1 | 5  
 vbadmin | -1 | 1  
(2 rows)

建议:

给用户设置足够的连接数, alter role ... CONNECTION LIMIT .

--------- 数据库连接限制:

datname | datconnlimit | connects   
----------+--------------+----------  
 postgres | -1 | 5  
 vastbase | -1 | 1  
(2 rows)

建议:

给数据库设置足够的连接数, alter database ... CONNECTION LIMIT .

* + 1. 数据库性能分析

--------- TOP 5 SQL : total\_cpu\_time

建议:

检查SQL是否有优化空间, 配合auto\_explain插件在csvlog中观察LONG SQL的执行计划是否正确.

--------- 索引数超过4并且SIZE大于10MB的表:

current\_database | nspname | relname | pg\_size\_pretty | idx\_cnt   
------------------+---------+---------+----------------+---------  
(0 rows)  
  
 current\_database | nspname | relname | pg\_size\_pretty | idx\_cnt   
------------------+---------+---------+----------------+---------  
(0 rows)  
  
 current\_database | nspname | relname | pg\_size\_pretty | idx\_cnt   
------------------+---------+---------+----------------+---------  
(0 rows)

建议:

索引数量太多, 影响表的增删改性能, 建议检查是否有不需要的索引.

--------- 上次巡检以来未使用或使用较少的索引:

current\_database | schemaname | relname | indexrelname | idx\_scan | idx\_tup\_read | idx\_tup\_fetch | pg\_size\_pretty   
------------------+------------+---------+--------------+----------+--------------+---------------+----------------  
(0 rows)  
  
 current\_database | schemaname | relname | indexrelname | idx\_scan | idx\_tup\_read | idx\_tup\_fetch | pg\_size\_pretty   
------------------+------------+---------+--------------+----------+--------------+---------------+----------------  
(0 rows)  
  
 current\_database | schemaname | relname | indexrelname | idx\_scan | idx\_tup\_read | idx\_tup\_fetch | pg\_size\_pretty   
------------------+------------+---------------------------------+----------------------------------+----------+--------------+---------------+----------------  
 postgres | snapshot | snap\_class\_vital\_info | snap\_class\_info\_name | 0 | 0 | 0 | 9080 kB  
 postgres | snapshot | snap\_summary\_statio\_all\_indexes | snap\_summary\_statio\_indexes\_name | 0 | 0 | 0 | 6144 kB  
 postgres | snapshot | snap\_summary\_stat\_all\_indexes | snap\_summary\_stat\_indexes\_name | 0 | 0 | 0 | 6120 kB  
 postgres | snapshot | snap\_summary\_statio\_all\_tables | snap\_summary\_statio\_tables\_name | 0 | 0 | 0 | 3736 kB  
(4 rows)

--------- 数据库统计信息, 回滚比例, 命中比例, 数据块读写时间, 死锁, 复制冲突:

datname | rollback\_ratio | hit\_ratio | blk\_read\_time | blk\_write\_time | conflicts | deadlocks   
-----------+----------------+-----------+---------------+----------------+-----------+-----------  
 template1 | 0 % | 0 % | 0 | 0 | 0 | 0  
 cicgroup | 0 % | 100 % | 0 | 0 | 0 | 0  
 template0 | 0 % | 0 % | 0 | 0 | 0 | 0  
 vastbase | 1.1 % | 100 % | 0 | 0 | 0 | 0  
 postgres | 0 % | 100 % | 0 | 0 | 0 | 0  
(5 rows)

建议:

回滚比例大说明业务逻辑可能有问题, 命中率小说明shared\_buffer要加大, 数据块读写时间长说明块设备的IO性能要提升, 死锁次数多说明业务逻辑有问题, 复制冲突次数多说明备库可能在跑LONG SQL.

--------- 检查点, bgwriter 统计信息:

-[ RECORD 1 ]---------+------------------------------  
checkpoints\_timed | 2  
checkpoints\_req | 0  
checkpoint\_write\_time | 0  
checkpoint\_sync\_time | 0  
buffers\_checkpoint | 0  
buffers\_clean | 0  
maxwritten\_clean | 0  
buffers\_backend | 0  
buffers\_backend\_fsync | 0  
buffers\_alloc | 0  
stats\_reset | 2021-12-10 14:44:12.192857+08

建议:

checkpoint\_write\_time多说明检查点持续时间长, 检查点过程中产生了较多的脏页.

checkpoint\_sync\_time代表检查点开始时的shared buffer中的脏页被同步到磁盘的时间, 如果时间过长, 并且数据库在检查点时性能较差, 考虑一下提升块设备的IOPS能力.

buffers\_backend\_fsync太多说明需要加大shared buffer 或者 减小bgwriter\_delay参数.

* + 1. 数据库垃圾分析

--------- 索引膨胀检查:

-[ RECORD 1 ]----+----------------------------  
db | cicgroup  
schemaname | pg\_catalog  
tablename | pg\_amproc  
tups | 418  
pages | 4  
otta | 3  
tbloat | 1.3  
wastedpages | 1  
wastedbytes | 8192  
wastedsize | 8192 bytes  
iname | pg\_amproc\_fam\_proc\_index  
itups | 418  
ipages | 4  
iotta | 2  
ibloat | 2  
wastedipages | 2  
wastedibytes | 16384  
wastedisize | 16384 bytes  
totalwastedbytes | 24576  
-[ RECORD 2 ]----+----------------------------  
db | cicgroup  
schemaname | pg\_catalog  
tablename | pg\_cast  
tups | 380  
pages | 3  
otta | 3  
tbloat | 0  
wastedpages | 0  
wastedbytes | 0  
wastedsize | 0 bytes  
iname | pg\_cast\_source\_target\_index  
itups | 380  
ipages | 4  
iotta | 2  
ibloat | 2  
wastedipages | 2  
wastedibytes | 16384  
wastedisize | 16384 bytes  
totalwastedbytes | 16384  
-[ RECORD 3 ]----+----------------------------  
db | cicgroup  
schemaname | pg\_catalog  
tablename | pg\_amproc  
tups | 418  
pages | 4  
otta | 3  
tbloat | 1.3  
wastedpages | 1  
wastedbytes | 8192  
wastedsize | 8192 bytes  
iname | pg\_amproc\_oid\_index  
itups | 418  
ipages | 4  
iotta | 2  
ibloat | 2  
wastedipages | 2  
wastedibytes | 16384  
wastedisize | 16384 bytes  
totalwastedbytes | 24576  
-[ RECORD 4 ]----+----------------------------  
db | cicgroup  
schemaname | pg\_catalog  
tablename | pg\_ts\_config\_map  
tups | 316  
pages | 2  
otta | 2  
tbloat | 0  
wastedpages | 0  
wastedbytes | 0  
wastedsize | 0 bytes  
iname | pg\_ts\_config\_map\_index  
itups | 316  
ipages | 4  
iotta | 2  
ibloat | 2  
wastedipages | 2  
wastedibytes | 16384  
wastedisize | 16384 bytes  
totalwastedbytes | 16384  
-[ RECORD 5 ]----+----------------------------  
db | cicgroup  
schemaname | pg\_catalog  
tablename | pg\_cast  
tups | 380  
pages | 3  
otta | 3  
tbloat | 0  
wastedpages | 0  
wastedbytes | 0  
wastedsize | 0 bytes  
iname | pg\_cast\_oid\_index  
itups | 380  
ipages | 4  
iotta | 2  
ibloat | 2  
wastedipages | 2  
wastedibytes | 16384  
wastedisize | 16384 bytes  
totalwastedbytes | 16384  
  
-[ RECORD 1 ]----+----------------------------  
db | vastbase  
schemaname | pg\_catalog  
tablename | pg\_amproc  
tups | 418  
pages | 4  
otta | 3  
tbloat | 1.3  
wastedpages | 1  
wastedbytes | 8192  
wastedsize | 8192 bytes  
iname | pg\_amproc\_fam\_proc\_index  
itups | 418  
ipages | 4  
iotta | 2  
ibloat | 2  
wastedipages | 2  
wastedibytes | 16384  
wastedisize | 16384 bytes  
totalwastedbytes | 24576  
-[ RECORD 2 ]----+----------------------------  
db | vastbase  
schemaname | pg\_catalog  
tablename | pg\_cast  
tups | 380  
pages | 3  
otta | 3  
tbloat | 0  
wastedpages | 0  
wastedbytes | 0  
wastedsize | 0 bytes  
iname | pg\_cast\_source\_target\_index  
itups | 380  
ipages | 4  
iotta | 2  
ibloat | 2  
wastedipages | 2  
wastedibytes | 16384  
wastedisize | 16384 bytes  
totalwastedbytes | 16384  
-[ RECORD 3 ]----+----------------------------  
db | vastbase  
schemaname | pg\_catalog  
tablename | pg\_amproc  
tups | 418  
pages | 4  
otta | 3  
tbloat | 1.3  
wastedpages | 1  
wastedbytes | 8192  
wastedsize | 8192 bytes  
iname | pg\_amproc\_oid\_index  
itups | 418  
ipages | 4  
iotta | 2  
ibloat | 2  
wastedipages | 2  
wastedibytes | 16384  
wastedisize | 16384 bytes  
totalwastedbytes | 24576  
-[ RECORD 4 ]----+----------------------------  
db | vastbase  
schemaname | pg\_catalog  
tablename | pg\_ts\_config\_map  
tups | 316  
pages | 2  
otta | 2  
tbloat | 0  
wastedpages | 0  
wastedbytes | 0  
wastedsize | 0 bytes  
iname | pg\_ts\_config\_map\_index  
itups | 316  
ipages | 4  
iotta | 2  
ibloat | 2  
wastedipages | 2  
wastedibytes | 16384  
wastedisize | 16384 bytes  
totalwastedbytes | 16384  
-[ RECORD 5 ]----+----------------------------  
db | vastbase  
schemaname | pg\_catalog  
tablename | pg\_cast  
tups | 380  
pages | 3  
otta | 3  
tbloat | 0  
wastedpages | 0  
wastedbytes | 0  
wastedsize | 0 bytes  
iname | pg\_cast\_oid\_index  
itups | 380  
ipages | 4  
iotta | 2  
ibloat | 2  
wastedipages | 2  
wastedibytes | 16384  
wastedisize | 16384 bytes  
totalwastedbytes | 16384  
  
-[ RECORD 1 ]----+----------------------------  
db | postgres  
schemaname | pg\_catalog  
tablename | pg\_amproc  
tups | 418  
pages | 4  
otta | 3  
tbloat | 1.3  
wastedpages | 1  
wastedbytes | 8192  
wastedsize | 8192 bytes  
iname | pg\_amproc\_fam\_proc\_index  
itups | 418  
ipages | 4  
iotta | 2  
ibloat | 2  
wastedipages | 2  
wastedibytes | 16384  
wastedisize | 16384 bytes  
totalwastedbytes | 24576  
-[ RECORD 2 ]----+----------------------------  
db | postgres  
schemaname | pg\_catalog  
tablename | pg\_cast  
tups | 380  
pages | 3  
otta | 3  
tbloat | 0  
wastedpages | 0  
wastedbytes | 0  
wastedsize | 0 bytes  
iname | pg\_cast\_source\_target\_index  
itups | 380  
ipages | 4  
iotta | 2  
ibloat | 2  
wastedipages | 2  
wastedibytes | 16384  
wastedisize | 16384 bytes  
totalwastedbytes | 16384  
-[ RECORD 3 ]----+----------------------------  
db | postgres  
schemaname | pg\_catalog  
tablename | pg\_amproc  
tups | 418  
pages | 4  
otta | 3  
tbloat | 1.3  
wastedpages | 1  
wastedbytes | 8192  
wastedsize | 8192 bytes  
iname | pg\_amproc\_oid\_index  
itups | 418  
ipages | 4  
iotta | 2  
ibloat | 2  
wastedipages | 2  
wastedibytes | 16384  
wastedisize | 16384 bytes  
totalwastedbytes | 24576  
-[ RECORD 4 ]----+----------------------------  
db | postgres  
schemaname | pg\_catalog  
tablename | pg\_ts\_config\_map  
tups | 316  
pages | 2  
otta | 2  
tbloat | 0  
wastedpages | 0  
wastedbytes | 0  
wastedsize | 0 bytes  
iname | pg\_ts\_config\_map\_index  
itups | 316  
ipages | 4  
iotta | 2  
ibloat | 2  
wastedipages | 2  
wastedibytes | 16384  
wastedisize | 16384 bytes  
totalwastedbytes | 16384  
-[ RECORD 5 ]----+----------------------------  
db | postgres  
schemaname | pg\_catalog  
tablename | pg\_cast  
tups | 380  
pages | 3  
otta | 3  
tbloat | 0  
wastedpages | 0  
wastedbytes | 0  
wastedsize | 0 bytes  
iname | pg\_cast\_oid\_index  
itups | 380  
ipages | 4  
iotta | 2  
ibloat | 2  
wastedipages | 2  
wastedibytes | 16384  
wastedisize | 16384 bytes  
totalwastedbytes | 16384

建议:

如果索引膨胀太大, 会影响性能, 建议重建索引, create index CONCURRENTLY ... .

--------- 垃圾数据:

current\_database | schemaname | relname | n\_dead\_tup   
------------------+------------+---------+------------  
(0 rows)  
  
 current\_database | schemaname | relname | n\_dead\_tup   
------------------+------------+---------+------------  
(0 rows)  
  
 current\_database | schemaname | relname | n\_dead\_tup   
------------------+------------+---------+------------  
(0 rows)

建议:

通常垃圾过多, 可能是因为无法回收垃圾, 或者回收垃圾的进程繁忙或没有及时唤醒, 或者没有开启autovacuum, 或在短时间内产生了大量的垃圾 .

可以等待autovacuum进行处理, 或者手工执行vacuum table .

* + 1. 数据库年龄分析

--------- 数据库年龄:

datname | age   
-----------+-------  
 vastbase | 15506  
 cicgroup | 14151  
 template0 | 14151  
 template1 | 13857  
 postgres | 13563  
(5 rows)

建议:

数据库的年龄正常情况下应该小于vacuum\_freeze\_table\_age, 如果剩余年龄小于5亿, 建议人为干预, 将LONG SQL或事务杀掉后, 执行vacuum freeze .

--------- 表年龄:

table\_name | age   
-----------------------+-------  
 pg\_statistic | 14151  
 pg\_ts\_dict | 14151  
 pg\_type | 14151  
 gs\_client\_global\_keys | 14151  
 pg\_authid | 14151  
(5 rows)  
  
 table\_name | age   
-----------------------+-------  
 pg\_type | 15506  
 pg\_ts\_dict | 15506  
 gs\_client\_global\_keys | 15506  
 pg\_authid | 15506  
 pg\_statistic | 15506  
(5 rows)  
  
 table\_name | age   
-----------------------+-------  
 gs\_client\_global\_keys | 13563  
 pg\_ts\_dict | 13563  
 pg\_type | 13563  
 pg\_authid | 13563  
 pg\_statistic | 13563  
(5 rows)

建议:

表的年龄正常情况下应该小于vacuum\_freeze\_table\_age, 如果剩余年龄小于5亿, 建议人为干预, 将LONG SQL或事务杀掉后, 执行vacuum freeze .

--------- 长事务, 2PC:

(No rows)  
(No rows)

建议:

长事务过程中产生的垃圾, 无法回收, 建议不要在数据库中运行LONG SQL, 或者错开DML高峰时间去运行LONG SQL. 2PC事务一定要记得尽快结束掉, 否则可能会导致数据库膨胀.

参考: http://blog.163.com/digoal@126/blog/static/1638770402015329115636287/

* + 1. 数据库XLOG, 流复制状态分析

-------- 是否开启归档, 自动垃圾回收:

name | setting   
-----------------+------------  
 archive\_command | (disabled)  
 archive\_mode | off  
 autovacuum | on  
(3 rows)

建议:

建议开启自动垃圾回收, 开启归档.

--------- 归档统计信息:

pg\_xlogfile\_name   
--------------------------  
 000000010000000000000039  
(1 row)

--------- 流复制统计信息:

(No rows)

建议:

关注流复制的延迟, 如果延迟非常大, 建议排查网络带宽, 以及本地读xlog的性能, 远程写xlog的性能.

--------- 流复制插槽:

pg\_xlog\_location\_diff | slot\_name | plugin | slot\_type | datoid | database | active | xmin | catalog\_xmin | restart\_lsn | dummy\_standby   
-----------------------+-----------+--------+-----------+--------+----------+--------+------+--------------+-------------+---------------  
(0 rows)

* + 1. 数据库安全或潜在风险分析

--------- 密码泄露检查

4.1\_error\_log.txt:2021-12-05 09:53:05.609 vastbase vastbase [local] 140683460278016 0 0 [BACKEND] ERROR: Please use "ALTER ROLE user\_name PASSWORD 'password';" to set the password of user vastbase before other operation!  
4.1\_error\_log.txt:2021-12-05 09:52:56.191 vastbase vastbase [local] 140683460278016 0 0 [BACKEND] ERROR: Please use "ALTER ROLE user\_name PASSWORD 'password';" to set the password of user vastbase before other operation!  
4.1\_error\_log.txt:2021-12-05 09:52:43.266 vastbase vastbase [local] 140683460278016 0 0 [BACKEND] ERROR: Please use "ALTER ROLE user\_name PASSWORD 'password';" to set the password of user vastbase before other operation!  
4.1\_error\_log.txt:2021-12-05 09:52:42.547 vastbase vastbase [local] 140683460278016 0 0 [BACKEND] ERROR: Please use "ALTER ROLE user\_name PASSWORD 'password';" to set the password of user vastbase before other operation!  
generate\_report\_g100.sh:cat $pg\_log\_dir/postgresql-${log\_date}\*.log | grep -E "^[0-9]" | grep -i -r -E "role|group|user" |grep -i "password"|grep -i -E "create|alter" > 11.2\_check\_log.txt  
11.4\_pg\_authid.txt: rolname | rolsuper | rolinherit | rolcreaterole | rolcreatedb | rolcatupdate | rolcanlogin | rolreplication | rolssoadmin | rolauditadmin | rolsystemadmin | rolconnlimit | rolpassword | rolvalidbegin | rolvaliduntil | rolrespool | roluseft | rolparentid | roltabspace | rolkind | rolnodegroup | roltempspace | rolspillspace | rolexcpdata | rolmonitoradmin | roloperatoradmin | rolpolicyadmin

rolname | rolsuper | rolinherit | rolcreaterole | rolcreatedb | rolcatupdate | rolcanlogin | rolreplication | rolssoadmin | rolauditadmin | rolsystemadmin | rolconnlimit | rolpassword | rolvalidbegin | rolvaliduntil | rolrespool | roluseft | rolparentid | roltabspace | rolkind | rolnodegroup | roltempspace | rolspillspace | rolexcpdata | rolmonitoradmin | roloperatoradmin | rolpolicyadmin   
----------+----------+------------+---------------+-------------+--------------+-------------+----------------+-------------+---------------+----------------+--------------+------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------+---------------+---------------+--------------+----------+-------------+-------------+---------+--------------+--------------+---------------+-------------+-----------------+------------------+----------------  
 vbadmin | t | t | t | t | t | t | t | f | f | t | -1 | sha25685a78ac11d0a8c8e15f6cdb0f0f5ca2f6f7baf5e50a1f5ce9632e98a397b6edca22e92ed44601731a2e299682c6b1c4f9dd67adfb9dc3d56d77eedf936d3bcc73378617490986f1890fdca824fca8613b24263aa8149e70a21afac0a79598236md5bff25e902fb76162a5cd8fb16a590a6cecdfecefade | | | default\_pool | t | 0 | | n | 0 | | | | f | f | f  
 vbaudit | f | t | t | f | f | t | f | f | t | f | -1 | sha2567763931e9cc5c7026d8111e9cf1e050328bd8b2bb2f489288b211abe61c9bf11af873aa3255d03dd898461063be4353ab5ad1bc17927b73204176b4dc6140f7d3011e2e6b4d4bf5b443736c059e4f18ef906676b4b7a55766e37140f2ed36770md55ebd3397ae68afd8b08524002a308008ecdfecefade | | | default\_pool | t | 0 | | n | 0 | | | | f | f | f  
 vbsso | f | t | t | f | f | t | f | t | f | f | -1 | sha256775d9b6c00c78d172addfb0729692177471fb0689431bdef8cff3a2f5d5acc26e393649b3e9b8a016047f805c0e13579e46c1b810fe4e20c5d5f14b9f7b4fafcc112a46d038aedd7365d6188549e921bbc5c1ff5c6d7ed3af374a6e2f59fb123md539b8b02de049074df4d5c4577aa61c35ecdfecefade | | | default\_pool | f | 0 | | n | 0 | | | | f | f | f  
 vastbase | t | t | t | t | t | t | t | t | t | t | -1 | sha256db7741cdf7e975dc442c243e82517ee48030321b4785788faec0ab8cdd63fe0ebc924d0be945d7311b8787d5f3c3c3844f19e7e5d0e1d1003486669baa128fba60d19154236fc61a9897dfe1a7416bf53ab704fc12637f8dad3520d35d77f329md5a130185891fb8f36d5ca1838b3d90c06ecdfecefade | | | default\_pool | t | 0 | | n | 0 | | | | t | t | t  
 grp\_nd | f | t | f | f | f | t | f | f | f | t | 100 | sha25677dd341239ec00c9d77a1ca1d469b595dabf18f701a79030f81d070fac9c27ce6b747e37720d53c2f7bb51648c252aba13dba31f609c994d5b82db39b74c7157393fc8fab93d32b83debdad65895b55cd4ae0598bb6dbc494c828a2768bdaa8emd5ed073c92f98de343b606b12abb06301decdfecefade | | | default\_pool | f | 0 | | n | | | | | f | f | f  
(5 rows)

current\_database | umid | srvid | srvname | umuser | usename | umoptions   
------------------+------+-------+---------+--------+---------+-----------  
(0 rows)  
  
 current\_database | schemaname | viewname | viewowner | definition   
------------------+------------+----------+-----------+------------  
(0 rows)  
  
 current\_database | umid | srvid | srvname | umuser | usename | umoptions   
------------------+------+-------+---------+--------+---------+-----------  
(0 rows)  
  
 current\_database | schemaname | viewname | viewowner | definition   
------------------+------------+----------+-----------+------------  
(0 rows)  
  
 current\_database | umid | srvid | srvname | umuser | usename | umoptions   
------------------+------+-------+---------+--------+---------+-----------  
(0 rows)  
  
 current\_database | schemaname | viewname | viewowner | definition   
------------------+------------+----------+-----------+------------  
(0 rows)

建议:

暂未出现密码泄露问题

----密码到期检查

rolname | rolvaliduntil   
----------------------+---------------  
 vbadmin |   
 vbaudit |   
 vbsso |   
 vb\_read\_all\_settings |   
 vastbase |   
 grp\_nd |   
(6 rows)

建议:

到期后, 用户将无法登陆, 记得修改密码, 同时将密码到期时间延长到某个时间或无限时间，暂不需要修改。

--------- 普通用户对象上的规则安全检查

current\_database | schemaname | tablename | rulename | definition   
------------------+------------+-----------+----------+------------  
(0 rows)  
  
 current\_database | schemaname | tablename | rulename | definition   
------------------+------------+-----------+----------+------------  
(0 rows)  
  
 current\_database | schemaname | tablename | rulename | definition   
------------------+------------+-----------+----------+------------  
(0 rows)

建议:

防止普通用户在规则中设陷阱, 注意有危险的security invoker的函数调用, 超级用户可能因为规则触发后误调用这些危险函数(以invoker角色).

--------- 普通用户自定义函数安全检查

current\_database | rolname | nspname | proname   
------------------+---------+---------+----------------  
 cicgroup | grp\_nd | grp\_nd | createseqmaxno  
 cicgroup | grp\_nd | grp\_nd | createmaxno  
(2 rows)  
  
 current\_database | rolname | nspname | proname   
------------------+---------+---------+---------  
(0 rows)  
  
 current\_database | rolname | nspname | proname   
------------------+---------+---------+---------  
(0 rows)

建议:

防止普通用户在函数中设陷阱, 注意有危险的security invoker的函数调用, 超级用户可能因为触发器触发后误调用这些危险函数(以invoker角色).

--------- unlogged table 和 哈希索引

current\_database | rolname | nspname | relname   
------------------+----------+------------+----------------------------  
 cicgroup | vastbase | pg\_catalog | statement\_history  
 cicgroup | vastbase | pg\_toast | pg\_toast\_13009  
 cicgroup | vastbase | pg\_toast | pg\_toast\_13009\_index  
 cicgroup | vastbase | pg\_catalog | statement\_history\_time\_idx  
(4 rows)  
  
 current\_database | pg\_get\_indexdef   
------------------+-----------------  
(0 rows)  
  
 current\_database | rolname | nspname | relname   
------------------+----------+------------+----------------------------  
 vastbase | vastbase | pg\_catalog | statement\_history  
 vastbase | vastbase | pg\_toast | pg\_toast\_13009  
 vastbase | vastbase | pg\_toast | pg\_toast\_13009\_index  
 vastbase | vastbase | pg\_catalog | statement\_history\_time\_idx  
(4 rows)  
  
 current\_database | pg\_get\_indexdef   
------------------+-----------------  
(0 rows)  
  
 current\_database | rolname | nspname | relname   
------------------+----------+------------+----------------------------  
 postgres | vastbase | pg\_catalog | statement\_history  
 postgres | vastbase | pg\_toast | pg\_toast\_13009  
 postgres | vastbase | pg\_toast | pg\_toast\_13009\_index  
 postgres | vastbase | pg\_catalog | statement\_history\_time\_idx  
(4 rows)  
  
 current\_database | pg\_get\_indexdef   
------------------+-----------------  
(0 rows)

建议

unlogged table和hash index不记录XLOG, 无法使用流复制或者log shipping的方式复制到standby节点, 如果在standby节点执行某些SQL, 可能导致报错或查不到数据

在数据库CRASH后无法修复unlogged table和hash index, 不建议使用.

PITR对unlogged table和hash index也不起作用.

--------- 触发器, 事件触发器：

current\_database | relname | tgname | proname | tgenabled   
------------------+---------+--------+---------+-----------  
(0 rows)  
  
 current\_database | owner | trigger\_name | trigger\_type | triggering\_event | trigger\_body | before\_statement | after\_statement   
------------------+-------+--------------+--------------+------------------+--------------+------------------+-----------------  
(0 rows)  
  
 current\_database | relname | tgname | proname | tgenabled   
------------------+---------+--------+---------+-----------  
(0 rows)  
  
 current\_database | owner | trigger\_name | trigger\_type | triggering\_event | trigger\_body | before\_statement | after\_statement   
------------------+-------+--------------+--------------+------------------+--------------+------------------+-----------------  
(0 rows)  
  
 current\_database | relname | tgname | proname | tgenabled   
------------------+---------+--------+---------+-----------  
(0 rows)  
  
 current\_database | owner | trigger\_name | trigger\_type | triggering\_event | trigger\_body | before\_statement | after\_statement   
------------------+-------+--------------+--------------+------------------+--------------+------------------+-----------------  
(0 rows)

建议

请管理员注意触发器和事件触发器的必要性.

--------- 检查是否使用了a-z 0-9 \_ 以外的字母作为对象名：

datname   
---------  
(0 rows)  
  
 current\_database | relname | relkind   
------------------+---------+---------  
(0 rows)  
  
 current\_database | typname   
------------------+---------  
(0 rows)  
  
 current\_database | proname   
------------------+---------  
(0 rows)  
  
 current\_database | nspname | relname | attname   
------------------+---------+---------+---------  
(0 rows)  
  
 current\_database | relname | relkind   
------------------+---------+---------  
(0 rows)  
  
 current\_database | typname   
------------------+---------  
(0 rows)  
  
 current\_database | proname   
------------------+---------  
(0 rows)  
  
 current\_database | nspname | relname | attname   
------------------+---------+---------+---------  
(0 rows)  
  
 current\_database | relname | relkind   
------------------+---------+---------  
(0 rows)  
  
 current\_database | typname   
------------------+---------  
(0 rows)  
  
 current\_database | proname   
------------------+---------  
(0 rows)  
  
 current\_database | nspname | relname | attname   
------------------+---------+---------+---------  
(0 rows)

建议：

建议任何identify都只使用 a-z, 0-9, \_ (例如表名, 列名, 视图名, 函数名, 类型名, 数据库名, schema名, 物化视图名等等).

--------- 锁等待:

(No rows)

建议:

锁等待状态, 反映业务逻辑的问题或者SQL性能有问题, 建议深入排查持锁的SQL.

--------- 继承关系检查:

inhrelid | inhparent | inhseqno   
----------+-----------+----------  
(0 rows)  
  
 inhrelid | inhparent | inhseqno   
----------+-----------+----------  
(0 rows)  
  
 inhrelid | inhparent | inhseqno   
----------+-----------+----------  
(0 rows)

建议:

如果使用继承来实现分区表, 注意分区表的触发器中逻辑是否正常, 对于时间模式的分区表是否需要及时加分区, 修改触发器函数 . "

建议继承表的权限统一, 如果权限不一致, 可能导致某些用户查询时权限不足.

* + 1. 重置统计信息

--------- 重置pg\_stat\_statements统计信息:

pg\_stat\_reset   
---------------  
   
(1 row)  
  
 pg\_stat\_reset   
---------------  
   
(1 row)  
  
 pg\_stat\_reset   
---------------  
   
(1 row)  
  
 pg\_stat\_reset\_shared   
----------------------  
   
(1 row)

建议: