LightDB Install Manual

发行版本 23.1

LightDB

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1 前言

恒生电子企业级数据库 LightDB 安装包名格式为:

lightdb-x-version-revision-os.arch.zip

- lightdb-x: 数据库名
- version:数据库版本号,目前最新为13.8-23.1,13.8 表示基于 PostgreSQL 13.8 版本,23.1 表示 2023 年 第1个 Release 版本

- revision: 源代码提交编号
- os: 安装包适用的操作系统
- arch:安装包适用的 CPU 架构

目前支持如下平台:

Architecture	OS
x86_64(intel)	CentOS7/RHEL7 /rockylinux8/麒麟 V10SP1
x86_64(海光)	麒麟 V10/麒麟 V10SP1/麒麟 V10SP2
aarch64	CentOS7/RHEL7 /rockylinux8/麒麟 V10SP1/麒麟 V10SP2

本文档主要介绍 LightDB 在 x86_64 CentOS 7.6 平台的安装过程及注意事项,其他支持的操作系统如有 差异,请根据实际情况灵活调整。

麒麟 V10SP2 操作系统安装可使用麒麟 V10SP1 相关的安装包,其中海光-麒麟 V10SP2 安装 23.2 版本及其 之前的安装包,需要替换安装包中 install.sh 脚本的 check_version 函数,函数替换如下

```
function check_version(){
    if [ ! -d "$PACKAGE" ] ;then
        echo "The install package is not existed"
        exit 1
    fi
        osnameCopy=$osname
    if [[ "$arch" == "$AARCH64" || "$arch" == "$HYGON64" ]] && [ "$osname" == "$KY10SP2
    +" ]; then
        osname=$KY10SP1
    fi
        isExisted=$(echo $PACKAGE|grep -w $osname | grep -w $arch )
    if [ -z "$isExisted" ] ;then
        echo "The install package is not support the ${osnameCopy} os and ${arch} arch"
        exit 1
    fi
    }
}
```

安装过程会自动在/home/lightdb/.bashrc 中配置 PATH、LTHOME、LTDATA 等环境变量,安装完成后,需 重新登录 Shell 会话生效。

2 推荐配置

配置参数	最低配置	推荐配置
CPU	16 核	96 核
内存	64GB	256GB
存储	60GB, SSD NVMe	1TB 以上 SSD NVMe 或 PMEM
网络	千兆网络	千兆网络

3 安装前准备

本章节所有准备工作,如无特殊说明,均需要在 root 用户下进行。

3.1 防火墙配置

如果您的环境有防火墙,则需要在防火墙中开启以下端口:

端口	协议	用途
默认 5432	TCP	数据库服务
123	UDP	NTP 校时服务

其中,数据库服务的端口 5432 为默认值,这个值在安装过程中可以自行指定,如果希望使用其他端口,则 在此处需要将 5432 修改为实际值。

注意:请务必确保上述端口未作他用。以下为防火墙配置参考步骤。

• 如果使用 firewall 防火墙,请执行以下命令,其中第一条命令中的 5432 需修改为实际使用的端口

firewall-cmd --permanent --add-port=5432/tcp
firewall-cmd --permanent --add-port=123/udp

• 如果使用 iptables 防火墙,请执行以下命令,其中第一条命令中的 5432 需修改为实际使用的端口

```
iptables -A INPUT -p tcp --dport 5432 -j ACCEPT
iptables -A INPUT -p udp --dport 123 -j ACCEPT
```

- 如果使用其他防火墙,则参考防火墙相关文档正确开放端口
- 如果您的环境可以关闭防火墙,则可以使用下面命令停止并禁用防火墙

```
systemctl stop firewalld.service
systemctl disable firewalld.service
systemctl stop NetworkManager.service
systemctl disable NetworkManager.service
```

3.2 关闭 SELINUX

```
sed -i "s/SELINUX=enforcing/SELINUX=disabled/g" /etc/selinux/config setenforce 0 \,
```

3.3 检查时间和时区

查看当前时区设置。

```
[root@lightdb ~]# timedatectl
Local time: Thu 2021-07-22 10:54:39 CST
Universal time: Thu 2021-07-22 02:54:39 UTC
RTC time: Thu 2021-07-22 02:54:39
Time zone: Asia/Shanghai (CST, +0800)
NTP enabled: yes
NTP synchronized: yes
RTC in local TZ: no
DST active: n/a
```

如果需要修改时区,可以参考如下示例,先使用 timedatectl list-timezones 列出所有可选的时 区,然后使用 timedatectl set-timezone 设置新的时区,下面的例子展示了将时区设置为 Asia/ Shanghai。

```
timedatectl list-timezones
timedatectl set-timezone Asia/Shanghai
```

3.4 安装依赖包

```
# 安装包通用运行依赖, GUI安装和命令行安装均需要
yum install -y procps-ng
yum install -y coreutils
# GUI安装运行依赖, 仅GUI安装需要
yum install -y gtk2
yum install -y libXtst
yum install -y dejavu-fonts # 麒麟v10sp1可能需要安装字体
# 数据库的运行依赖
yum install -y readline
yum install -y zlib
yum install -y libxml2
yum install -y openssl-libs
yum install -y uuid
yum install -y c-ares libpcap snappy # tshark
yum install -y ncurses-libs # iftop
yum install -y libnl3 # keepalived ipv6
yum install -y libzstd # canopy
yum install -y sysstat
yum install -y json-c
vum install -v libicu
yum install -y bc
```

在安装包下的 system-lib 目录下有部分 rpm 包,可以使用 rpm -ivh <rpm 包>直接安装。

如果要使用oracle_fdw或wal2sql,需要正确安装oracle客户端SDK,oracle客户端SDK在 arm 环境使用 19版本,在 x86环境使用 21版本的客户端。

如果使用mysql_fdw,则需要正确安装 mysql-client 库, mysql 客户端使用 8.0 版本。其中 oracle 客户端需注意配 置如下环境变量:

```
# oracle客户端环境变量配置样例
export ORACLE_HOME=/home/lightdb/instantclient_21_6
export LD_LIBRARY_PATH=$ORACLE_HOME:$LD_LIBRARY_PATH
export TNS_ADMIN=$ORACLE_HOME/network/admin
```

3.5 创建 lightdb 用户并设置 sudo 免密

• 创建 lightdb 用户与用户组

```
groupadd lightdb
useradd -g lightdb -m lightdb
passwd lightdb
```

• 为 lightdb 用户设置 sudo 免密,如下图所示,在/etc/sudoers 中新增一行 lightdb ALL=(ALL) NOPASSWD:ALL

3.6 创建 LightDB 安装目录和实例目录

以 LightDB 安装目录为/usr/local/lightdb 为例,创建该目录,并为其设置用户(组)权限。

```
mkdir -p /usr/local/lightdb
chown -R lightdb:lightdb /usr/local/lightdb
```

默认情况下, LightDB 实例目录为安装目录下的一个子目录, 此时不需要手工创建实例目录。

也可以指定其他实例目录,此时需要手工创建,并为其设置用户(组)权限,以/data/lightdb_data为例:

mkdir -p /data/lightdb_data
chown -R lightdb:lightdb /data/lightdb_data

3.7 配置操作系统内核参数

配置 sysctl.conf

运行下列命令以设置推荐的操作系统内核参数。

```
echo "kernel.shmmni=4096" >> /etc/sysctl.conf
echo "kernel.shmmax=$(expr $(getconf _PHYS_PAGES) / 2 \* $(getconf PAGE_SIZE))" \
>> /etc/sysctl.conf
echo "kernel.shmall=$(expr $(getconf _PHYS_PAGES) / 2)" >> /etc/sysctl.conf
echo "kernel.sem=500 2048000 200 4096" >> /etc/sysctl.conf
echo "fs.aio-max-nr=1048576" >> /etc/sysctl.conf
echo "fs.file-max=524288" >> /etc/sysctl.conf
echo "vm.swappiness=5" >> /etc/sysctl.conf
```

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```
echo "vm.overcommit_memory=2" >> /etc/sysctl.conf
echo "vm.overcommit_ratio=75" >> /etc/sysctl.conf
echo "vm.dirty_background_ratio=5" >> /etc/sysctl.conf
echo "vm.dirty_ratio=40" >> /etc/sysctl.conf
echo "vm.dirty_expire_centisecs=500" >> /etc/sysctl.conf
echo "vm.dirty_writeback_centisecs=250" >> /etc/sysctl.conf
echo "net.core.somaxconn=2000" >> /etc/sysctl.conf
echo "net.ipv4.tcp_max_syn_backlog=2000" >> /etc/sysctl.conf
echo "net.ipv4.tcp_tw_reuse=1" >> /etc/sysctl.conf
echo "net.ipv4.tcp_syn_retries=3" >> /etc/sysctl.conf
echo "net.ipv4.tcp_retries2=5" >> /etc/sysctl.conf
echo "net.ipv4.tcp_syn_retries=3" >> /etc/sysctl.conf
echo "net.ipv4.tcp_slow_start_after_idle=0" >> /etc/sysctl.conf
```

如果服务器物理内存大于 128GB, 尤其是达到 256GB 甚至更高时,强烈建议开启 Linux 系统的 hugepage,同时将大页内存设置为 shared_buffers 的 1.1~1.2 倍,关于 shared_buffers 的介绍可参考官方文档 https://www.hs.net/lightdb/docs/html/runtime-config-resource.html#RUNTIME-CONFIG-RESOURCE-MEMORY,开启 hugepage 的配置方法如下所示。

echo "vm.nr_hugepages = 大页页数" >> /etc/sysctl.conf

其中, 大页页数 = (shared_buffers * 1.1~1.2) / hugepage_size, hugepage_size 的值因系统和 个人设置而异, 查看方法为:

cat /proc/meminfo | grep Hugepagesize

最后,运行 sysctl -p 使设置生效,生效后可通过 cat /proc/meminfo 确认 hugepage 的配置与使用 情况。

```
[lightdb@host102 ~]$ cat /proc/meminfo | grep Huge
AnonHugePages: 12288 kB
HugePages_Total: 802
HugePages_Free: 187
HugePages_Rsvd: 1
HugePages_Surp: 0
Hugepagesize: 524288 kB
```

配置 limits.conf

运行下列命令以设置推荐的操作系统内核参数。

```
echo "lightdb hard core unlimited" >> /etc/security/limits.conf
echo "lightdb soft core unlimited" >> /etc/security/limits.conf
echo "lightdb hard nofile 524288" >> /etc/security/limits.conf
echo "lightdb soft nofile 524288" >> /etc/security/limits.conf
echo "lightdb hard nproc 16384" >> /etc/security/limits.conf
echo "lightdb soft nproc 16384" >> /etc/security/limits.conf
```

然后 su - lightdb 切换到 lightdb 用户使设置生效,运行 ulimit -c、ulimit -n和 ulimit -u命 令确认设置生效。

```
[lightdb@host102 ~]$ ulimit -c
unlimited
[lightdb@host102 ~]$ ulimit -n
```

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```
524288
[lightdb@host102 ~]$ ulimit -u
16384
```

3.8 开启 Swap 交换区

使用 free -h 查看是否已开启 Swap 交换区,如未配置,则可以按以下步骤配置开启。

 创建交换区空白文件,文件大小即为交换区大小,如果磁盘空间充足,建议当物理内存不超过 128GB 时,Swap大小设为物理内存的一半,建议当物理内存大于 128GB 时,Swap大小设为固定 128GB。下 面的示例将交换区文件创建在/swap,大小为 2GB,目的仅用于示例。实际配置请按照上述建议决定交 换区大小,并选择合适的磁盘路径来放置交换区文件。

dd **if**=/dev/zero of=/swap bs=1M count=2048 # Swap交换区大小 = 2048MB

2. 使用 mkswap 格式化文件

mkswap -f /swap

3. 修改交换区文件权限为 0600

chmod 0600 /swap

4. 启用刚刚创建的交换区

swapon /swap

5. 设置开机自动启用,修改/etc/fstab 文件,添加如下配置

/swap swap swap defaults 0 0

3.9 配置 SSH 免密互通

注意:本步骤仅在安装 LightDB 高可用、分布式常规模式、分布式多机单实例模式三种情形时需要,如果安 装单机版或分布式单机多实例模式,则可跳过本章节。关于分布式常规模式、分布式多机单实例模式的定义, 请参考本文档 6.1 LightDB 分布式三种部署模式简介。

以高可用一主一从为例,主节点 IP 为 192.168.10.110,从节点 IP 为 192.168.10.128,主从**均切换到 lightdb 用** 户,按如下所示步骤进行配置。

```
# 免密认证,所有服务器都要执行
ssh-keygen -t rsa -P "" -f ~/.ssh/id_rsa
# 证书同步,所有服务器都要执行
ssh-copy-id lightdb@192.168.10.128
ssh-copy-id lightdb@192.168.10.110
# 免密验证,主机SSH连接从机,无需输密码
[lightdb@localhost install]$ ssh lightdb@192.168.10.128
Last login: Thu Aug 12 09:02:32 2021
```

3.10 配置 NTP 校时服务

注意:本步骤仅在安装 LightDB 高可用、分布式常规模式、分布式多机单实例模式三种情形时需要,如果安装单机版或分布式单机多实例模式,则可跳过本章节。关于分布式常规模式、分布式多机单实例模式的定义,请参考本文档 6.1 LightDB 分布式三种部署模式简介。

配置 NTP 校时服务的方法在安装过程中会有引导信息提示,详细步骤在后续章节中具体说明。如果您希望 自行配置 NTP 服务,请务必确保用于安装 LightDB 的服务器全部配置完成,不能出现部分启动了 NTP、部 分未启动的情形,否则 LightDB 将在校验 NTP 服务启动情况这一步骤失败。

3.11 准备 LightDB 安装包

根据前言中介绍的安装包名规则和目标主机的实际情况,选择正确的 LightDB 安装包上传到/home/ lightdb 目录,并确保安装包的用户与用户组均为 lightdb。

解压安装包,进入解压后目录。运行 install.sh 脚本,进入安装过程,根据安装向导提示信息,此处有两种安装方式,输入 Yes为 GUI 安装,输入 No为命令行安装。

```
[lightdb-x-13.8-23.1-10551-el7.x86_64] $ ./install.sh
Whether to use the graphical user interface (GUI, Make sure DISPLAY is configured, Such as [export DISPLAY=127.0.0.1:0.
0])?(Yes or No)
no|
```

如果选择 GUI 安装, 需要满足下列条件: - Windows 上运行 Xmanager - Passive, 并通过 Xshell SSH 连接服务器 - 目标服务器已配置 DISPLAY 环境变量

```
export DISPLAY=WindowsIP:0.0
```

其中, WindowsIP 为运行 Xmanager - Passive 的主机 IP 地址, 冒号: 后面的值一般为 0.0, 具体取决于 Xmanager - Passive 运行后的状态提示, 如下图所示。



• 目标服务器已安装 libXtst、gtk2、libX11 这几个运行 GUI 需要的依赖包

yum install -y libXtst gtk2 libX11

如果无法满足上述条件,或者已满足上述条件,但仍无法显示 GUI 安装向导界面,则可以选用命令行安装, 二者除了向导方式外,并无任何差异。

4 安装 LightDB 单机版

4.1 GUI 安装 LightDB 单机版

• 按前面所述要求, 配置 DISPLAY 环境变量, 在 install.sh 命令行提示信息中输入 yes, 按回车键确认, Windows 中就会弹出 GUI 安装向导界面。

[lightdb-x-13.8-23.1	1-10551-el7.x80	5_64] \$./instal	l.sh						
Whether to use the g	graphical user	interface (GUI,	Make sure	DISPLAY is	configured,	Such as	[export D	ISPLAY=127.0.0.1:	0
.0])?(Yes or No)									
ves									

 界面中包含三个选项,选项一(默认选项) 仅安装数据库;选项二除了安装数据库外,还会生成一个 默认的实例目录,并使用默认实例启动数据库;选项三为开发者模式,该模式下将使用默认数据库参数,而不会对参数进行自动调优。

LightDB Enterprise Postgres	s13.8-23.1 Installer - Step 1 of 6	- ×
Select Configuration Options		Es
 Configuration Option Prerequisite Checks Database Install Location Summary Install Finish 	 Select any of the following install options Set Up Software Only. Create and Configure instance database. This option creates a database. Developer mode, convenient for developers to use, omit some parameters configuration. 	
	< Back Next > Inst	all Cancel

•本文档使用选项二,以展示完整的安装过程。



•选择安装模式,提供单机版、高可用、分布式三个选项,默认为单机版,此处我们使用默认选择。

LightDB Enterprise Postgres	:13.8-23.1 Installer - Step 2 of 12 - X
Select Install Mode	
A Configuration Option	
 Installation Mode Port Setting Prerequisite Checks Compatible Type Database Process Type Database Install Location Configuration Parameters Database Password Summary Install Finish 	 Single Mode Single mode requires only one computer to install. Single mode has a single point of failure problem and cannot guarantee availability, so it cannot be used in production scenarios and it is only suitable for test scenarios with low security requirements. High Availability Mode High availability mode requires one master and multiple slaves (at least two machines) to install, and the performance of the master and slave needs to be consistent so that the same performance can still be provided after failover. The high availability mode can automatically fail over, solving the problem of single point of failure and ensuring the reliability of system services. Distributed Mode Distributed mode requires multiple coordination nodes and multiple worker nodes, coordination nodes to distribute queries and aggregate results, and worker nodes to store and compute. Distributed mode can expand the storage and computing power of the database by adding nodes, completely breaking through the performance bottleneck of a single machine.
	< Back Next > Install Cancel

•选择单机版进入下一步,配置端口号,默认为5432,可自行指定任意合法端口。如果指定了一个非法端口或正在使用的端口,点击 Next 会无法进入下一步,同时界面中会给出错误提示信息。

LightDB Enterprise Postgres:	13.8-23.1 Installer - Step 3 of 12		- ×
Port Setting			5 20
A Configuration Option			
A Installation Mode			
Port Setting			
Prerequisite Checks	Database Port: 5432		
 Compatible Type 			
 Database Process Type 			
 Database Install Location 			
 Configuration Parameters 			
Database Password			
Summary			
Install			
 Finish 			
		< Back Next >	Install Cancel

• 检查依赖包和 Linux 内核参数。如有依赖缺失,则无法进入下一步,必须先安装依赖,再点击 Check Again 重新检查;如有内核参数与推荐配置不符的,则会给出 WARNING,此时可以先按建议值重新 配置,再点击 Check Again,也可以直接点击 Ignore All 忽略全部警告,直接进入下一步。

LightDB Enterprise Postgres1	13.8-23.1 Installer - Step 4 of 12			- ×
Perform Prerequisite Checks				
Configuration Option				
Installation Mode	10.20.148.122			
Port Setting	Check Arein			Ignore All
Prerequisite Checks	Спеск Адаіп			
Compatible Type	Checks	Recommended value	Current Value	Status
Database Process Type	▼ Checks			
Database Install Location	▼ File Handler			
Configuration Parameters	file_max	524288	524288	Ok
Database Password	 Memory 	4096	4096	Ok
Summary	shmmax	8412581888	8412577792	Warning
Install	shmall	2053853	2053852	Warning
Finich	swappiness	5	5	Ok
1111511	overcommit_memory	2	2	Ok
	overcommit ratio	75	50	Warning
	Total: 32 Ok: 25 Error: 0 Warn	ing: 7 Ignore: 0 Unknown:	D	
			< Back Next >	Install Cancel

•选择兼容模式,如果你的应用从 mysql 或 oracle 迁移而来,则可以对应选择 mysql 或 oracle, LightDB 会 启用相应的兼容特性。

LightDB Enterprise Postgres1	3.8-23.1 Installer - Step 5 of 12		- ×
Select Compatible Type			5 20
A Configuration Option			
A Installation Mode	LightDB		
 Port Setting 	Compatible with PostgreSQL		
 Prerequisite Checks 			
Compatible Type	Oracle		
 Database Process Type 	Compatible with Oracle		
 Database Install Location 	compatible with ofacte		
 Configuration Parameters 			
 Database Password 	MySQL		
Summary	Compatible with MySQL		
 Install 			
Finish			
		< Back Next >	Install Cancel

• OLTP/OLAP 选择,该选项会影响部分 GUC 参数的默认值策略,默认为 OLTP,此处使用默认值。

LightDB Enterprise Postgres	13.8-23.1 Installer - Step 6 of 12 - X					
Select Process Type						
A Configuration Option						
A Installation Mode	OLTP					
 Port Setting 	On-Line Transaction Processing, OLTP is the primary application of traditional relational databases for basic.					
 Prerequisite Checks 	daily transactions, such as bank transactions					
 Compatible Type 	OLAP					
Database Process Type						
 Database Install Location 	On-Line Analytical Processing. OLAP is the primary application of data warehouse systems, supporting complex analytical operations, focusing on decision support, and providing intuitive and easy-to-understand query					
 Configuration Parameters 	results.					
 Database Password 						
Summary						
 Install 						
 Finish 						
	< Back Next > Install Cancel					

• 指定数据库安装目录和实例目录 (要确保 lightdb 用户有写入权限),(参考创建 LightDB 安装目录和实例 目录),可以在文本框中直接修改或点击 Browse 调出路径选择对话框,来指定其他目录。此外还可 以选择是否开启归档模式,默认开启。

LightDB Enterprise Postgres1	.3.8-23.1 Installer - St	ep 7 of 12			-	- ×
Installation Location					5	E ?
A Configuration Option						
A Installation Mode	Specify a path for i instance, the insta	installing all LightDB software and storing configura nce directory is automatically generated.	tion informati	on. If you ne	eed to inst	tall an
Port Setting						
Prerequisite Checks						
Compatible Type	LightDB base:	/home/lightdb/stage	Browse			
 Database Process Type 	Install Location: /ho	ome/lightdb/stage/lightdb-x/13.8-23.1				
Database Install Location						
Configuration Parameters	LightDB Instance:	/home/lightdb/stage/lightdb-x/13.8-23.1/cluster	Browse			
 Database Password 						
 Summary 						
Install	✓ Enable archive					
• Finish						
			< Back	Next >	Install	Cancel

• 配置 shared_buffers 与 effective_cache_size 大小, 以及设置字符集。默认 shared_buffers = 25% * 总物理内存, 默认 effective_cache_size = 70% * 总物理内存, 默认字符集为 UTF-8, 并提供 GBK、SQL_ASCII、LATIN1 三个其他选项。

LightDB Enterprise Postgres	13.8-23.1 Installer - Step 8 of 1	2		-	- ×
Configuration Parameters			1	S?	E °?
A Configuration Option	memory character set				
A Installation Mode					
Port Setting					
 Prerequisite Checks 	shared_buffers(MB):		25%		
Compatible Type		4011			
 Database Process Type 	effective_cache_size(MB):	4011	70%		
 Database Install Location 		1 8,023.5 16,045			
Configuration Parameters		11231			
Database Password					
Summary					
 Install 					
Finish					
			< Back Next >	Install	Cancel

LightDB Enterprise Postgres	13.8-23.1 Installer - Step 8 of	12			- ×
Configuration Parameters			0.0	1	
A Configuration Option	memory character set				
A Installation Mode					
 Port Setting 					
 Prerequisite Checks 	Character set				
 Compatible Type 	character set.	0110			
 Database Process Type 					
 Database Install Location 					
Configuration Parameters					
 Database Password 					
 Summary 					
 Install 					
• Finish					
			< Back	lext > Install	Cancel

• 配置 super 用户(即 lightdb)密码,密码长度为 6-16 个字符,且至少包含数字、英文字母,密码不支持 以#开头。

LightDB Enterprise Postgres13.8-2.	3.1 Installer - Step 9	of 12			- ×
Set Password					5 50
A Configuration Option					
A Installation Mode	Paceword	password	-		
Port Setting	Fassword.	password			
Prerequisite Checks			_		
Compatible Type	Confirm Password:	password			
Database Process Type					
 Database Install Location 					
Configuration Parameters					
Database Password					
 Summary 					
Install					
• Finish					
				< Back Next >	Install Cancel

• LightDB 安装信息总览,确认无误后,点击 Install 执行安装。(可以点击 Save Response File 把安装信息保存为文件,以后如果需要重新安装时可以简化输入操作)

LightDB Enterprise Postgres13.8-23.1 Installer - Step 10 of 12

Summary			00
A Configuration Option	▼ LightDB Enterprise Installer		â
A Installation Mode	 Global Info 		
 Port Setting 	Base Location:	/home/lightdb/stage	
Prerequisite Checks	Home Location:	/home/lightdb/stage/lightdb-x/13.8-23.1	
	Configuration Option:	INSTALL_AND_CREATE	
• Compatible Type	User:	lightdb	
 Database Process Type 	Password:	lightdb123	
 Database Install Location 	LightDB Workload:	OLTP	
 Configuration Parameters 	Deploy Mode:	SINGLE	
 Database Password 	Character Set:	UTF8	
Summany	Shared Buffers:	4GB	
- Summary	Effective Cache Size:	11GB	
 Install 	Compatible Type:	LightDB	
 Finish 	▼ Server		
	 Computer 	10.20.148.122	~
	<		
		Save Respons	e File
		< Back Next > Install C	ancel

• 安装成功。

LightDB Enterprise Postgres:	13.8-23.1 Installer - Step 12 of 12	— ×
Finish		
A Configuration Option		
A Installation Mode	Install successfully.	
 Port Setting 		
Prerequisite Checks		
 Compatible Type 		
 Database Process Type 		
 Database Install Location 		
 Configuration Parameters 		
 Database Password 		
Summary		
Install		
• Finish		

< Back Next > Finish Cancel

- ×

4.2 命令行安装 LightDB 单机版

命令行安装步骤及选项与 GUI 安装完全相同,仅在向导信息提示上有所不同,因此本章节不再详细解释其中内容的含义与注意事项。

• 在 install.sh 命令行提示信息中输入 No,按回车键确认,进入命令行安装交互界面。

```
[lightdb-x-13.8-23.1-10551-el7.x86_64] $ ./install.sh
Whether to use the graphical user interface (GUI, Make sure DISPLAY is configured, Such as [export DISPLAY=127.0.0.1:0.
0])?(Yes or No)
no|
```

 选择配置模式,键入1 仅安装数据库,键入2 会额外创建一个实例,输入3 为开发者选项,默认为1, 此处选择2。

```
Choice a kind of configuration mode!
1: Only install.
2: Install database and Create instance.
3: Developer
Please enter 1 2 or 3(The default is 1):
```

 选择安装单机版、高可用版或分布式版, 键入1安装单机版, 键入2选择高可用版, 键入3选择分布 式版, 默认为单机版。

```
Choice a kind of install mode!
1: Single Mode.
2: High Availability Mode
3: Distributed Mode
Please enter 1, 2 or 3:(The default is 1)
```

• 指定端口号, 默认为 5432。

```
Assign a port to the LightDB!
Listen Port(The default port is 5432):
5432
```

• 检查依赖包与 Linux 内核参数,检查通过后会进入下一步选择,否则会报错并给出提示信息,其中 WARNING 会默认全部忽略。

======== 10.20.148.122 ============= NETWORK name: sem, recommend value: 500,2048000,200,4096, current value: 500,2048000,200,4096, status: OK name: aio_max_nr, recommend value: 1048576, current value: 1048576, status: OK name: somaxconn, recommend value: 2000, current value: 2000, status: OK name: tcp_max_syn_backlog, recommend value: 2000, current value: 2000, status: OK name: tcp_tw_reuse, recommend value: 1, current value: 0, status: WARNING name: tcp_syn_retries, recommend value: 3, current value: 6, status: WARNING name: tcp_retries2, recommend value: 5, current value: 15, status: WARNING name: tcp_slow_start_after_idle, recommend value: 0, current value: 1, status: WARNING PAGE CACHE name: dirty_background_ratio, recommend value: 5, current value: 5, status: OK name: dirty_ratio, recommend value: 40, current value: 40, status: OK name: dirty_expire_centisecs, recommend value: 500, current value: 500, status: OK name: dirty_writeback_centisecs, recommend value: 250, current value: 250, status: OK MEMORY name: shmmni, recommend value: 4096, current value: 4096, status: OK name: shmmax, recommend value: 8412581888, current value: 8412577792, status: WARNING name: shmall, recommend value: 2053853, current value: 2053852, status: WARNING name: swappiness, recommend value: 5, current value: 5, status: OK name: overcommit_memory, recommend value: 2, current value: 2, status: OK name: overcommit_ratio, recommend value: 75, current value: 50, status: WARNING FILE_HANDLER name: file_max, recommend value: 524288, current value: 524288, status: OK ULIMIT name: ulimit_core, recommend value: unlimited, current value: unlimited, status: OK name: ulimit_nofile, recommend value: 8192, current value: 524288, status: OK Dependency Package name: JSON-C-0.11 is existed: yes name: C-ARES-1 is existed: yes name: LIBNL3 is existed: ves name: LIBPCAP-1 is existed: yes name: LIBZSTD-1 is existed: yes name: LZ4-1 is existed: yes name: NCURSES-LIBS-5 is existed: yes name: READLINE-6 is existed: yes name: SNAPPY-1 is existed: yes name: UUID-1.6 is existed: yes name: LIBICU-50 is existed: yes

 选择兼容模式,如果你的应用从 mysql 或 oracle 迁移而来,则可以对应选择 mysql 或 oracle, LightDB 会 启用相应的兼容特性。

Choice a kind of Compatible Type! 1: LightdDB(Compatible with PostgreSQL). 2: ORACLE(Compatible with ORACLE). 3: MYSQL(Compatible with MYSQL). Please enter 1, 2 or 3:(The default is 1)

选择 OLTP 或 OLAP, 键人 1为 OLTP, 键人 2为 OLAP, 默认为 1。

Choice a kind of LightDB workload! 1: OLTP(On-line Transaction Processing). 2: OLAP(On-Line Analytical Processing). Please enter 1 or 2:(The default is 1)

• 指定 LightDB 安装目录和实例目录 (要确保 lightdb 用户有写入权限),此处均使用默自定义目录。

```
Specify a path for installing all LightDB software and storing configuration information.
Please enter base location(The default is /usr/local/lightdb):
/home/lightdb/stage
Base Location: /home/lightdb/stage
Install Location: /home/lightdb/stage/lightdb-x/13.8-23.1
Please enter instance location(The default is /home/lightdb/stage/lightdb-x/13.8-23.1/cluster):
Instance location: /home/lightdb/stage/lightdb-x/13.8-23.1/cluster
```

• 配置 LightDB 是否开启归档模式,默认开启。

Choice whether to enable archive: 1:yes 2:no Please enter 1 or 2:(The default is 1)

• 配置 shared_buffers 与 effective_cache_size 大小,以及设置字符集。

```
Please configure memory(MB) and character set!
Please enter shared_buffers, Default value is (4011):
128
Please enter effective_cache_size, Default value is (11231):
640
Please choice a kind of Character Set.
1. UTF8
2. GBK
3. SQL_ASCII
4. LATIN1
The default choice 1(UTF8)
```

• 设置 super 用户密码,密码长度为 6-16 个字符,且至少包含数字、英文字母,密码不支持以 # 开头。

Please enter LightDB password! Please enter original password: Please enter confirm password:

• 选择继续安装,直至安装完成。

Do you want to deploy immediately?(Yes or No, The default is yes) [>>>>>>>>>]100% Install Finish

5 安装 LightDB 高可用版

安装 LightDB 高可用,要求每一台主机都先完成 3.1-3.11 所述准备工作,然后按 3.9 所述打通 SSH 免密 (参考配置 SSH 免密互通),最后按 3.11 所述在作为 Primary 的主机上准备安装包 (参考准备 LightDB 安装包)。

5.1 GUI 安装 LightDB 高可用版

• 按前面所述要求, 配置 DISPLAY 环境变量, 在 install.sh 命令行提示信息中输入 yes, 按回车键确认, Windows 中就会弹出 GUI 安装向导界面。

```
[lightdb-x-13.8-23.1-10551-el7.x86_64] $ ./install.sh
Whether to use the graphical user interface (GUI, Make sure DISPLAY is configured, Such as [export DISPLAY=127.0.0.1:0
.0])?(Yes or No)
yes]
```

 界面中包含三个选项,选项一(默认选项) 仅安装数据库;选项二除了安装数据库外,还会生成一个 默认的实例目录,并使用默认实例启动数据库;选项三为开发者模式,该模式下将使用默认数据库参 数,而不会对参数进行自动调优。这里选择安装选项二,以展示完整的安装过程



•选择安装模式,提供单机版、高可用、分布式三个选项,默认为单机版,此处我们选择高可用版。



• 点击 Add, 在弹出的界面中添加虚拟 IP, 虚拟 IP 需要与配置的主备服务器在同一个网段,并且虚拟 IP 在本网段中没有被分配。

🥦 LightDB Enterprise Postgre	es13.8-23.1 Installer - 9	Step 3 of 15					— ×
Configuration Server					0		
Configuration Option							
Installation Mode	Server						
 Configuration Server 	name	vip/ip	port	role	sync/asyn	failover	operate
 Port Setting 	High Availability						Add
Prerequisite Checks							
Compatible Type							
 Database Process Type 	<u>S</u>	LightDB Enterprise Pos	tgres Installer			\times	
Database Install Location							
Configuration Parameters		Node Type: Clus	ter		•		
Database Password							
Summary							
Install		Virtual Ip: 10.2	20.148.10/24				
Root Service	1						
Check Service	< ـ					Add	
						Add	

• 点击虚拟 IP 对应的 Add 按钮 (下图箭头所指) 添加集群机器信息,为每一台服务器指定 IP、角色 (primary、standby、witness) 和同步方式 (none、sync、async), primary 和 witness 只能选择 none, standby 可以在 sync 和 async 中选择其一,如果选错,点击 Next 会无法进入下一步,同时界面中会有错误信息提示。配置完成后,点击 Add 进行添加,添加后还可以通过 Delete 删除。

Configuration Server					· .		s le
Configuration Option							
Installation Mode	Server						
Configuration Server	name	vip/ip	port	role	sync/asyn	failover	operate
Port Setting	 High Availability 						Add
Prerequisite Checks	Cluster	10.20.148.10/24					Add Dele
Compatible Type							
Database Process Type							
Database Install Location							
Configuration Parameters							
Database Password							
Summary							
Install							
Root Service							
Check Service							
Finish							

• LightDB 高可用版支持一主一从、一主多从两种部署方式。在节点的选择上,对于一主一从,witness 是可选的,而对于一主多从,witness 是必须的;在 standby 的同步异步选择上,如果节点处于同 一网段,则同步异步都可选择,如果处于不同的网段,则只能是异步;在网段的要求上,至少要有1个 standby和 primary位于同一网段。此处以一主一从一哨兵为例进行展示。

Configuration Server								
Configuration Option								
 Installation Mode 	Server							
 Configuration Server 	name	vip/ip	port	role	sync/asyn	failover	operate	e
 Port Setting 	 High Availability 						Add	
Prerequisite Checks	▼ Cluster	10.20.148.10/24					Add Dele	ete
Compatible Type	Server	10.20.148.126/24		primary	none	none	Delete	
Database Process Type	Server	10.20.148.127/24		standby	sync	yes	Delete	
 Database Install Location 	Server	10.20.148.128/24		witness	none	none	Delete	
Configuration Parameters								
 Database Password 								
Summary								
Install								
Root Service								
Check Service		abox mode						
• Finish	Only support one clus	ster hode.						

• 将安装包从当前服务器传输到其他机器上,这个过程可能需要几分钟时间,请耐心等待传输完成。

LightDB Enterprise Postgr	es13.8-23.1 Installer - Step 4 of 15			- ×
Port Setting		0	S.	E.
A Configuration Option				
A Installation Mode	transfer package			
 Configuration Server 	10.20.148.127: start transfer			
Port Setting				
Prerequisite Checks				
 Compatible Type 				
 Database Process Type 				
 Database Install Location 				
Configuration Parameters				
 Database Password 				
 Summary 				
 Install 				
Root Service				
Check Service				

• 配置端口号,默认为 5432,可自行指定任意合法端口,如果指定了一个非法端口或正在使用的端口, 点击 Next 会无法进入下一步,同时界面中会给出错误提示信息。

LightDB Enterprise Postgres:	13.8-23.1 Installer - S	tep 4 of 15				-	- ×
Port Setting				1 L		S?	Eo
A Configuration Option							
A Installation Mode							
 Configuration Server 							
Port Setting	Database Port:	5432					
Prerequisite Checks							
 Compatible Type 							
 Database Process Type 							
 Database Install Location 							
 Configuration Parameters 							
 Database Password 							
Summary							
Install							
 Root Service 							
Check Service							
• Finish							
				a Da ali	Newton	In she li	Grand
				< Back	Next >	Install	Cancel

• 检查每一台服务器的依赖包和 Linux 内核参数。如有依赖缺失,则无法进入下一步,必须先安装依赖, 再点击 Check Again 重新检查;如有内核参数与推荐配置不符的,则会给出 WARNING,此时可以 先按建议值重新配置,再点击 Check Again,也可以直接点击 Ignore All 忽略全部警告,直接 进入下一步。

		· ··	STE.
10.20.148.126 10.20.148.127	10.20.148.128		
Chack Again			Ignore All
Check Again			· y
Checks	Recommended value	Current Value	Status
 Checks 			
▼ File Handler			
file_max	524288	524288	Ok
shmmi	4096	4096	Ok
shmmax	8412581888	8412581888	Ok
shmall	2053853	2053853	Ok
swappiness	5	5	Ok
overcommit_memory	2	2	Ok
overcommit ratio	75	50	Warning
Total: 33 Ok: 27 Error: 0 Warni	ing: 6 Ignore: 0 Unknown: (0	
	10.20.148.126 10.20.148.127 Check Again Checks Checks File Handler file_max Memory shmmni shmmax shmall swappiness overcommit_ratio Total: 33 Ok: 27 Error: 0 Warning	10.20.148.126 10.20.148.127 10.20.148.128 Check Again Checks Recommended value Checks File Handler file_max 524288 Memory shmmni 4096 shmmax 8412581888 shmall 2053853 swappiness overcommit_ratio 75 Total: 33 Ok: 27 Error: 0 Warning: 6 Ignore: 0 Unknown: 4	10.20.148.126 10.20.148.127 10.20.148.128 Check Again Recommended value Current Value

•选择兼容模式,如果你的应用从 mysql 或 oracle 迁移而来,则可以对应选择 mysql 或 oracle, LightDB 会 启用相应的兼容特性。

LightDB Enterprise Postgre	s13.8-23.1 Installer - Step 6 of 15			_	- ×
Select Compatible Type				S?	E °,
A Configuration Option					
A Installation Mode	LightDB				
 Configuration Server 	Compatible with PostgreSQL				
 Port Setting 					
 Prerequisite Checks 	Oracle				
Compatible Type	Compatible with Oracle				
 Database Process Type 	Compatible with Oracle				
 Database Install Location 					
 Configuration Parameters 	MySQL				
 Database Password 	Compatible with MySQL				
 Summary 					
 Install 					
 Root Service 					
Check Service					
• Finish					
		< Back	Next >	Install	Cancel

• OLTP/OLAP 选择,该选项会影响部分 GUC 参数的默认值策略,默认为 OLTP,此处使用默认值。

LightDB Enterprise Postgres	13.8-23.1 Installer - Step 7 of 15 $ imes$
Select Process Type	
A Configuration Option	
A Installation Mode	OLTP
 Configuration Server 	On-Line Transaction Processing, OLTP is the primary application of traditional relational databases for basic.
Port Setting	daily transactions, such as bank transactions
 Prerequisite Checks 	OLAP
Compatible Type	
Database Process Type	On-Line Analytical Processing. OLAP is the primary application of data warehouse systems, supporting complex analytical operations, focusing on decision support, and providing intuitive and easy-to-understand guery
 Database Install Location 	results.
Configuration Parameters	
Database Password	
Summary	
 Install 	
Root Service	
Check Service	
 Finish 	
	< Back Next > Install Cancel

• 指定数据库安装目录和实例目录 (要确保 lightdb 用户有写入权限),(参考创建 LightDB 安装目录和实例 目录),可以在文本框中直接修改或点击 Browse 调出路径选择对话框,来指定其他目录。此外还可 以选择是否开启归档模式,默认开启。

LightDB Enterprise Postgres13.8-23.1 Installer - Step 8 of 15								
Installation Location					S?	E.S.		
A Configuration Option								
Installation Mode Specify a path for installing all LightDB software and storing configuration information. If you need to install an instance, the instance directory is automatically generated.								
Configuration Server								
 Port Setting 								
 Prerequisite Checks 	LightDB base:	/home/lightdb/stage	Browse					
Compatible Type	Install Location: /h	ome/lightdb/stage/lightdb-x/13.8-23.1						
 Database Process Type 								
Database Install Location	LightDB Instance:	/home/lightdb/stage/lightdb-x/13.8-23.1/data/def	Browse					
Configuration Parameters								
Database Password								
 Summary 	✓ Enable archive							
Install								
 Root Service 								
Check Service								
Finish								
			< Back		Install	Cancel		

• 配置 shared_buffers 与 effective_cache_size 大小, 以及设置字符集。默认 shared_buffers = 25% * 总物理内存, 默认 effective_cache_size = 70% * 总物理内存, 默认字符集为 UTF-8, 并提供 GBK、SQL_ASCII、LATIN1 三个其他选项。

LightDB Enterprise Postgres	s13.8-23.1 Installer - Step 9 of 1	5	— ×
Configuration Parameters		C	2. 5 E.
A Configuration Option	memory character set		
A Installation Mode			
 Configuration Server 			
 Port Setting 	shared_buffers(MB):		25%
 Prerequisite Checks 		1 8,023.5 16,045	
 Compatible Type 	effective_cache_size(MB):		70%
 Database Process Type 		1 8,023.5 16,045	
 Database Install Location 		11231	
Configuration Parameters			
 Database Password 			
 Summary 			
 Install 			
 Root Service 			
Check Service			
• Finish			
			< Back Next > Install Cancel

LightDB Enterprise Postgres	s13.8-23.1 Installer - Step 9 of 15	- ×
Configuration Parameters		STE?
A Configuration Option	memory character set	
A Installation Mode		
 Configuration Server 		
Port Setting	Character set: LITE8	
Prerequisite Checks	on a constant of the second seco	
Compatible Type		
 Database Process Type 		
 Database Install Location 		
Configuration Parameters		
 Database Password 		
Summary		
• Install		
 Root Service 		
Check Service		
• Finish		
	< Back	ext > Install Cancel

• 配置 super 用户(即 lightdb)密码,密码长度为 6-16 个字符,且至少包含数字、英文字母,密码不支持 以#开头。

LightDB Enterprise Postgres	13.8-23.1 Installer - Step 1	0 of 15				-	- ×
Set Password						5	Eo
A Configuration Option							
A Installation Mode	Password		7				
 Configuration Server 	rassword.						
 Port Setting 			1				
 Prerequisite Checks 	Confirm Password:	•••••	J				
 Compatible Type 							
 Database Process Type 							
 Database Install Location 							
 Configuration Parameters 							
Database Password							
Summary							
Install							
Root Service							
Check Service							
Finish							
				< Back	Next >	Install	Cancel

• LightDB 安装信息总览,确认没问题后点击 install 按钮开始正式安装 (在这里可以点击 SAVE Response File 把安装参数保存为文件,在以后想重新安装时可以简化安装步骤)。

LightDB Enterprise Postgres	13.8-23.1 Installer - Step 11 of 15		- ×
Summary			5 23
 Configuration Option 	▼ LightDB Enterprise Installer		Â
A Installation Mode	▼ Global Info		
 Configuration Server 	Base Location:	/home/lightdb/stage	
Port Setting	Home Location:	/home/lightdb/stage/lightdb-x/13.8-23.1	
	Configuration Option:	INSTALL_AND_CREATE	
	User:	lightdb	
 Compatible Type 	Password:	lightdb123	
 Database Process Type 	LightDB Workload:	OLTP	
 Database Install Location 	Deploy Mode:	HIGH_AVAILABLE	
 Configuration Parameters 	Character Set:	UTF8	
Database Password	Shared Buffers:	4GB	
	Effective Cache Size:	11GB	
• Summary	Compatible Type:	LightDB	
 Install 	▼ Server		
Root Service	▼ Cluster	10.20.148.10	~
Check Service	<[>
• Finish			Save Response File

< Back

Install

Cancel

• 总览信息确认无误后,点击 Install 执行安装。

LightDB Enterprise Postgres13.8-23.1 Installer - Step 12 of 15 Install A Configuration Option installation progress 🔺 Installation Mode Configuration Server Check Itclusterd keepalived successful! Port Setting [sh, /home/lightdb/ightdb-x-13.8-23.1-10551-el7.x86_64/script/ha/0.1.1_check_ltclusterd_keepalived.sh, witness, 10.20.148.128, 3, none, REMOTE, /home/lightdb/stage/lightdb-x/13.8-23.1, /home/lightdb/stage/lightdb-x/13.8-23.1/cluster/data, false] Prerequisite Checks Compatible Type [sh, /home/lightdb/lightdb-x-13.8-23.1-10551-el7.x86_64/script/ha/1_install.sh, primary, 10.20.148.126, 1, none, LOCAL, /home/lightdb/lightdb-x-13.8-23.1-10551-el7.x86_64/, /home/lightdb/stage, 5432, 13.8-23.1, lightdb123, HIGH_AVAILABLE] Database Process Type [sh, /home/lightdb/lightdb-x-13.8-23.1-10551-el7.x86_64/script/ha/2_lightdb-set-env-var.sh, primary, Database Install Location 10.20.148.126, 1, none, LOCAL, /home/lightdb/stage/lightdb-x/13.8-23.1, /home/lightdb/stage/lightdb-x/13.8-23.1/cluster/data, 5432, lightdb, 10.20.148.126] Configuration Parameters [sh, /home/lightdb/lightdb/k-3.3.8-23.1-10551-el7.x86_64/, /jhta/j.1install.sh, standby, 10.20.148.127, 2, sync, REMOTE, /home/lightdb/lightdb/lightdb-x-13.8-23.1-10551-el7.x86_64/, /home/lightdb/stage, 5432, 13.8-23.1, lightdb123, HIGH_AVAILABLE] Database Password Summary Install Root Service 🔄 LightDB Check Service Finish < Back Next > Cancel

- 此时数据库已经安装完成
- 配置 NTP 服务,集群多机器之间的时间同步是非常重要的,LightDB 默认采用高可用主机时间为参考, 向备机和 witness 机器同步时间。如果你有自己的时间服务器,可以在这里修改为你自己的 ntp 服务器 地址。如果你已经为所有的机器配置了 NTP 服务,则这一步会自动跳过。

LightDB Enterprise Postgre	es13.8-23.1 Installer - S	tep 13 of 16				_	_
Ntp server						S?	A
Configuration Option							
Installation Mode	Enter the ip addre	ss or domain name of the	ntp server, Allowed to	change.			
 Configuration Server 							
 Port Setting 	Ntp Server:	10.20.148.126					
 Prerequisite Checks 							
 Compatible Type 							
 Database Process Type 							
 Database Install Location 							
 Configuration Parameters 							
 Database Password 							
Summary							
Install							
Ntp server							
Root Service							
Check Service							
• Finish							
				< Back	Next >	Install	Ca

• 使用 ssh 客户端登录机器终端, 切换到 root 用户, 复制界面显示的命令并执行。执行的命令以实际 界面显示的为准。

下图中的命令为:

LightDB Enterprise Postgree	s13.8-23.1 Installer - Step 14 of 16 -	\times
Root Service		00
A Configuration Option		
A Installation Mode		
 Configuration Server 	You need to run the following command to start keepalived as root.	
 Port Setting 	ad the second is black to second in the data with 200 22.1 the state this	
Prerequisite Checks	./keepalived -f /home/lightdb/stage/lightdb-x/13.8-23.1/toois/bin	
 Compatible Type 	sh /home/lightdb/lightdb-v-13.8-23.1-10551-el7.x86.64/script/13.ntp.start.sh	
 Database Process Type 	/home/lightdb/stage/lightdb-x/13.8-23.1	
 Database Install Location 		
 Configuration Parameters 		
 Database Password 	To execute the configuration command, do the following:	
Summary	1. Open a terminal	
Install	2. Login as the root	
 Ntp server 	3. Run command	
Root Service	4. CIICK NEXT	
Check Service		
Finish		
	< Back Next > Finish Car	ncel

启动 keepalived 程序后,使用 ps 查询一下进程,如果发现 keepalived 没有起来,则查看 keepalived 配置 文件中的对外网卡名称是否配置正确,这里需要配置您的机器对外的网卡名称。

• 安装成功

LightDB Enterprise Postgres	13.8-23.1 Installer - Step 16 of 16		- ×
Finish			SS E:
Configuration Option			
A Installation Mode	Install successfully.		
 Configuration Server 			
 Port Setting 			
 Prerequisite Checks 			
 Compatible Type 			
 Database Process Type 			
 Database Install Location 			
 Configuration Parameters 			
 Database Password 			
Summary			
• Install			
 Ntp server 			
 Root Service 			
Check Service			
• Finish			
		< Back Next >	Finish Cancel

如果因环境等因素限制无法使用 keepalived,或者未启用 NTP 服务,会因检查不通过而无法点击 finish,则可直接点击 Cancel 退出安装向导,此时数据库已经安装成功,但 ntp 和 keepalived 可能 不正确,需要另外配置。

5.2 命令行安装 LightDB 高可用版

命令行安装步骤及选项与 GUI 安装完全相同,仅在向导信息提示上有所不同,因此本章节不再详细解释其中内容的含义与注意事项。

• 在 install.sh 命令行提示信息中输入 No,按回车键确认,进入命令行安装交互界面。

```
[lightdb-x-13.8-23.1-10551-el7.x86_64] $ ./install.sh
Whether to use the graphical user interface (GUI, Make sure DISPLAY is configured, Such as [export DISPLAY=127.0.0.1:0.
0])?(Yes or No)
no|
```

 选择配置模式,键入1 仅安装数据库,键入2 会额外创建一个实例,输入3 为开发者选项,默认为1, 此处选择2。

```
Choice a kind of configuration mode!
1: Only install.
2: Install database and Create instance.
3: Developer
Please enter 1 2 or 3(The default is 1):
```

 选择安装单机版、高可用或分布式, 键人1安装单机版, 键人2选择高可用版, 键人3安装分布式版, 默认为1, 此处选择2。

```
Choice a kind of install mode!
1: Single Mode.
2: High Availability Mode
3: Distributed Mode
Please enter 1, 2 or 3:(The default is 1)
```

 按照命令行提示信息,依次填写 Virtual IP,以及 primary、standby和 witness 服务器的 IP 与同步方式。在节点的选择上,对于一主一从,witness 是可选的,若不想指定可按回车键跳过, 而对于一主多从,witness 是必须的;在 standby的同步异步选择上,如果节点处于同一网段,则 同步异步都可选择,如果处于不同的网段,则只能是异步;在网段的要求上,至少要有1个 standby 和 primary位于同一网段。此处以一主一从一哨兵的方式进行展示。

```
Config Server for High Availability Mode!
Please enter a virtual IP address with network, such as (192.168.217.234/16):
10.20.148.10/24
The cluster need a primary server(required), one or more standby server(optional) and a witness server(optional).
Please input a primary server ip which is actually the ip of the current server(required). such as (192.168.217.234
/16):
10.20.148.126/24
Please input a standby server ip(required), such as (192.168.217.234/16):
10.20.148.127/24
Please enter status of the standby server [10.20.148.127]
1 sync:
2 async:
Please enter failover of the standby server [10.20.148.127]
1: yes
yes
Please enter 1 or 2!
Continue to add standby nodes?(enter [exit] to left.):
exit
Please input a witness server ip(optional), such as (192.168.217.234/16):
10.20.148.128/24
                         Vip: 10.20.148.10
Ip: 10.20.148.126 Role: primary Status: none Failover: none
Ip: 10.20.148.127 Role: standby Status: sync Failover: yes
Ip: 10.20.148.128 Role: witness Status: none Failover: none
```

确认集群各节点信息是否填写无误,确认无误后键人1继续,否则键人2进行重设,此处选择1。

 将安装包从当前服务器传输到其他机器上,这个过程可能需要几分钟时间,请耐心等待传输完成,直 到出现如下图所示的指定端口号的提示信息,端口号默认为5432,本次安装使用5433。



• 检查依赖包与 Linux 内核参数。



• 选择兼容模式,如果你的应用从 mysql 或 oracle 迁移而来,则可以对应选择 mysql 或 oracle, LightDB 会 启用相应的兼容特性。

Choice a kind of Compatible Type! 1: LightdDB(Compatible with PostgreSQL). 2: ORACLE(Compatible with ORACLE). 3: MYSQL(Compatible with MYSQL). Please enter 1, 2 or 3:(The default is 1)

•选择 OLTP/OLAP, 键入 1 为 OLTP, 键入 2 为 OLAP, 默认为 1。

- Choice a kind of LightDB workload! 1: OLTP(On-line Transaction Processing). 2: OLAP(On-Line Analytical Processing). Please enter 1 or 2:(The default is 1)
- 指定 LightDB 安装目录和实例目录 (要确保 lightdb 用户有写入权限)。

Specify a path for installing all LightDB software and storing configuration information. Please enter base location(The default is /usr/local/lightdb): /home/lightdb/install/stage Base Location: /home/lightdb/stage Install Location: /home/lightdb/stage/lightdb-x/13.8-23.1 Please enter instance location(The default is /home/lightdb/stage/lightdb-x/13.8-23.1/cluster):

Instance location: /home/lightdb/stage/lightdb-x/13.8-23.1/cluster

• 配置 LightDB 是否开启归档模式,默认开启。

Choice whether to enable archive: 1:yes 2:no Please enter 1 or 2:(The default is 1)

• 配置 shared_buffers 与 effective_cache_size 大小,以及设置字符集。

```
Please configure memory(MB) and character set!
Please enter shared_buffers, Default value is (4011):
Please enter effective_cache_size, Default value is (11231):
Please choice a kind of Character Set.
1. UTF8
2. GBK
3. SQL_ASCII
4. LATIN1
The default choice 1(UTF8)
```

设置管理员用户密码,键入时密码不可见,密码长度为6-16个字符,且至少包含数字、英文字母,密码不支持以#开头。

Please enter LightDB password! Please enter original password: Please enter confirm password:

• 选择继续安装,直至安装完成。

Do you want to deploy immediately?(Yes or No, The default is yes) yes [>>>>>>>>>]100%

 配置 NTP 服务,集群多机器之间的时间同步是非常重要的,LightDB 默认采用高可用主机时间为参考, 向备机和 witness 机器同步时间。如果你有自己的时间服务器,可以在这里修改为你自己的 ntp 服务器 地址。如果你已经为所有的机器配置了 NTP 服务,则这一步会自动跳过。

```
Ntp Server
```

- Enter the ip address or domain name of the ntp server, Allowed to change.(Default ntp ip:10.20.148.126)
- 使用 ssh 客户端登录机器终端, 切换到 root 用户, 复制界面显示的命令并执行。执行的命令以实际 界面显示的为准。

下图中的命令为:

```
# 启动keepalived服务(在所有主,备上执行,witness上不用执行)
cd /home/lightdb/stage/lightdb-x/13.8-23.1/tools/bin
./keepalived -f /home/lightdb/stage/lightdb-x/13.8-23.1/etc/keepalived/keepalived.
```

(续下页)

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启动 keepalived 程序后,使用 ps 查询一下进程,如果发现 keepalived 没有起来,则查看 keepalived 配置 文件中的对外网卡名称是否配置正确,这里需要配置您的机器对外的网卡名称。

• 上一步骤中的命令执行完成后,按任意键进入检查过程,检查通过后会输出 Install Finish 信息, 并自动退出安装向导。

5.3 LightDB 高可用常用操作指南

本小节介绍几个 LightDB 高可用版本常用操作的简易指南,更详细的信息请查阅 LightDB 数据库运维手册。

监控

查看节点间同步状态及延迟

```
SELECT * FROM pg_stat_replication; --主库查询
SELECT * FROM pg_stat_wal_receiver; --备库查询
```

查询结果示例,如下图所示。

lightdb@test=# SELECT * FROM pg_stat_replication;							
-[RECORD 1]+	-[RECORD 1]+						
pid	59133						
usesysid	24160						
usename	ltcluster						
application_name	lightdbCluster1921681051315433						
client_addr	192.168.105.131						
client_hostname							
client_port	32912						
backend_start	2022-09-30 16:22:15.577291+08						
backend_xmin							
state	streaming						
sent_lsn	0/60599C30						
write_lsn	0/60599C30						
flush_lsn	0/60599C30						
replay_lsn	0/60599C30						
write_lag	00:00:00.000385						
flush_lag	00:00:00.000675						
replay_lag	00:00:00.000682						
sync_priority	1						
sync_state	sync						
reply_time	2022-09-30 16:38:46.348411+08						

lightdb@test=# SELECT * FROM pg_stat_wal_receiver; -[RECORD 1]-----+ pid 7839
status 7839
status streaming
receive_start_lsn 0/6000000
receive_start_li 1
written_lsn 0/609CE5E8
flushed_lsn 0/609CE5E8
receive_start_li 1
last_msg_receipt_time 2022.09-30 16:41:44.546148+08
last_msg_receipt_time 2022.09-30 16:41:44.546603+08
lasts_msd_receive_start_li 1
latest_end_lsn 0/609CE5E8
latest_end_lsn 0/609CE5E8
latest_end_time 2022.09-30 16:41:44.546148+08
slot_name lttluster_stot_2
sender_host 192.168.105.130
sender_port 5433
conninf0 user=ltcluster passfile=/home/lightdb/.pgpass channel_binding=prefer connect_timeout=2 dbname=replication host=192.168.105.130 po
rt=5433 application_name=lightdbCluster1921681051315433 fallback_application_name=walreceiver sslmode=prefer sslcompression=0 ssl_min_protocol_version=TL
Sv1.2 gssencmode=disable krbsrvname=postgres target_session_attrs=any pid 7839

查看各节点状态

分别在 primay、standby、witness 运行下面的命令,以查看集群各节点状态。

\$LTHOME/bin/ltcluster -f \$LTDATA/../etc/ltcluster/ltcluster.conf node status

查询结果示例,如下图所示。



杳看集群状态

• 查看集群服务状态,需要重点关注的信息有: Role、Status (数据库运行状态)、Itclusterd (Itclusterd 守护进程运行状态)、Paused (Itclusterd 是否暂停)

ltcluster -f \$LTDATA/../etc/ltcluster/ltcluster.conf service status

注意:上述命令在 primary、standby、witness 上都可以执行, 且各节点上的执行结果应该是完全相同 的,若不完全相同,则说明集群状态有异,需及时排查原因。

以主库查询结果为例进行说明,如下图所示,正常状态下期望的结果为:

- Name、Role 应与实际相符
- Status 应为 running (primary 和 witness 前面还应有一个星号 *)
- ltclusterd 应为 running
- Paused? 应为 no (除非在相应节点上执行了 ltcluster -f \$LTDATA/../etc/ltcluster/ ltcluster.conf service pause 命令)

[lig	lightdb@localhost bin]\$./ltcluster -f/etc/ltcluster/ltcluster.conf service status							
ID	Name	Role	Status	Upstream	ltclusterd	PID	Paused?	Upstream last seen
	+	++				+		+
1	lightdbCluster1921681051305433	primary	* running		running	59059	no	n/a
2	lightdbCluster1921681051315433	standby	running	lightdbCluster1921681051305433	running	7883	no	1 second(s) ago
4	lightdbCluster1921681051325433	witness	* runnina	lightdbCluster1921681051305433	running	8278	no	0 second(s) ago

• 查看集群 IP 信息,如虚拟 IP

#查看所有网卡 ip a show ip a show [interface] #查看指定网卡

查询结果示例,如下图所示。

```
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: ens33: <BROADCAST,MULTICAST,UP,LOWER_UP> mtu 1500 qdisc pfifo_fast state UP group default qlen 1000
   link/ether 00:0c:29:cb:4c:2c brd ff:ff:ff:ff:ff:
   inet 192.168.105.131/24 brd 192.168.105.255 scope global dynamic ens33
    valid_lft 1158sec preferred_lft 1158sec
   inet6 fe80::20c:29ff:fecb:4c2c/64 scope link
   valid_lft forever preferred_lft forever
3: virbr0: <NO-CARRIER,BROADCAST,MULTICAST,UP> mtu 1500 qdisc noqueue state DOWN group default qlen 1000
   link/ether 52:54:00:fb:ld:ff brd ff:ff:ff:ff:ff:ff
   inet 192.168.122.255 scope global virbr0
   valid_lft forever preferred_lft forever
          inet 127.0.0.1/8 scope host lo
      valid_lft forever preferred_lft forever
virbr0-nic: <BROADCAST,MULTICAST> mtu 1500 qdisc pfifo_fast master virbr0 state DOWN group default qlen 1000
link/ether 52:54:00:fb:1d:ff brd ff:ff:ff:ff:ff:ff
  [lightdb@localhost bin]$ ip a show ens33
        ens33: <BROADCAST,MULTICAST,UP,LOWER_UP> mtu 1500 qdisc pfifo_fast state UP group default qlen 1000
          link/ether 00:0c:29:cb:4c:2c brd ff:ff:ff:ff:ff:ff
inet 192.168.105.131/24 brd 192.168.105.255 scope global dynamic ens33
```

valid_lft 1142sec preferred_lft 1142sec inet6 fe80::20c:29ff:fecb:4c2c/64 scope link valid lft forever preferred lft forever

查看日志

ltclusterd 的日志路径为 \$LTDATA/../etc/ltcluster/ltcluster.log, LightDB 数据库日志路径为 \$LTDATA/log/,其中数据库日志文件以日期时间命名,且新文件创建满足如下规律,可按照快速锁定目标 日志文件。

- 每次启动都会产生一个新的日志文件
- 若无数据库重启,则每天产生一个新的日志文件

管理

主库重启

主库因修改数据库参数或其他原因需要重启,可以按以下步骤操作。

1. 先停止备库的 keepalived (重要),在 root 用户下执行以下命令

```
# 1. 获得备库keepalived进程pid
cat /var/run/keepalived.pid
# 2. 杀死keepalived进程
kill keepalived_pid
# 3. 确认keepalived进程确实已不存在
```

ps aux | grep keepalived

2. 主库重启,需要在 lightdb 用户下执行,重启期间主库不提供服务

1. 暂停ltclusterd, 防止自动failover ltcluster -f \$LTDATA/../etc/ltcluster/ltcluster.conf service pause # 2. 查看集群状态,确认primary的Paused?状态为yes ltcluster -f \$LTDATA/../etc/ltcluster/ltcluster.conf service status # 3. 先断开所有连接到数据库的客户端和应用程序(否则数据库将stop failed),然后停止主库 lt_ctl -D \$LTDATA stop # 默认会回滚所有未断开的连接 # 如果有连接存在导致stop failed,则可以尝试使用 lt_ctl -D \$LTDATA stop -m smart # 如果仍然stop failed,且因条件限制无法或不希望断开所有客户端连接,则可以使用-m_ →immediate强制停止数据库 #此方式下没有回滚连接,即强制断开、强制停止,没有完全shutdown,会导致在启动时recovery lt_ctl -D \$LTDATA stop -m immediate # 4. 等待数据库停止成功,确认步骤3执行结果中出现server stopped信息 # 5. 修改数据库参数,或做其他事情 # 6. 启动主库 lt_ctl -D \$LTDATA start # 7. 等待数据库启动成功,确认步骤6执行结果中出现server started的信息 # 8. 恢复ltclusterd ltcluster -f \$LTDATA/../etc/ltcluster/ltcluster.conf service unpause

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9. 查看集群状态,确认primary的Paused?状态为no ltcluster -f \$LTDATA/../etc/ltcluster/ltcluster.conf service status

3. 备库重新启动 keepalived (需 root 用户), 启动方法请参照本文档 5.3(参考LightDB 高可用常用操作指 南)。

备库重启

备库因修改数据库参数或其他原因需要重启,可以在 lightdb 用户下按以下步骤操作。

1. 暂停ltclusterd, 防止自动failover ltcluster -f \$LTDATA/../etc/ltcluster/ltcluster.conf service pause # 2. 查看集群状态,确认standby的Paused?字段为yes ltcluster -f \$LTDATA/../etc/ltcluster/ltcluster.conf service status # 3. 先断开所有连接到数据库的客户端和应用程序(否则数据库将stop failed),然后停止备库 lt_ctl -D \$LTDATA stop # 默认会回滚所有未断开的连接 # 如果有连接存在导致stop failed,则可以尝试使用 lt_ctl -D \$LTDATA stop -m smart # 如果仍然stop failed,且因条件限制无法或不希望断开所有客户端连接,则可以使用-m_ →immediate强制停止数据库, #此方式下没有回滚连接,即强制断开、强制停止,没有完全shutdown,会导致在启动时recovery lt_ctl -D \$LTDATA stop -m immediate # 4. 等待数据库停止成功,确认步骤3执行结果中出现server stopped信息 # 5. 修改数据库参数,或做其他事情 # 6. 启动备库 lt_ctl -D \$LTDATA start # 7. 等待数据库启动成功,确认步骤6执行结果中出现server started的信息 # 8. 恢复ltclusterd ltcluster -f \$LTDATA/../etc/ltcluster/ltcluster.conf service unpause # 9. 确认standby的Paused?字段为no ltcluster -f \$LTDATA/../etc/ltcluster/ltcluster.conf service status

主备切换

在集群状态正常时进行主备切换,可以通过在备机上使用 switchover 来自动完成,方法如下。

```
# switchover会自动对集群做pause和unpuase操作,不需手动执行pause/unpause
# 1. 在备机上试运行
ltcluster -f $LTDATA/../etc/ltcluster/ltcluster.conf standby switchover --siblings-
→follow --dry-run
```
(接上页)

```
# 2. 如果试运行结果最后一行信息为: prererequisites for executing STANDBY SWITCHOVER_
→are met,则表示成功,可以进入下一步
```

```
# 3. 在备机上正式运行switchover主备切换
ltcluster -f $LTDATA/../etc/ltcluster/ltcluster.conf standby switchover --siblings-
→follow
# 4. 在各节点上分别查看集群状态,确认各节点执行结果中primary和standby角色确实已互换
```

ltcluster -f \$LTDATA/../etc/ltcluster/ltcluster.conf service status

主库故障恢复

当主库发生故障(如宕机) failover 后,备库会自动提升为新主库,以确保集群继续可用。

此后,若原主库故障修复,想重新加入集群,可以使用 rejoin 使原主库恢复成为新备库,然后再执行一次主备切换,恢复到最初的主备关系。

在原主库上 rejoin 的步骤如下:

```
# 1. 确认LightDB已停止
# 2. 确认1tclusterd是否启动,若不存在则启动它
ps aux | grep ltcluster
ltclusterd -d -f `realpath $LTDATA/../etc/ltcluster/ltcluster.conf` -p $LTDATA/../etc/
→ltcluster/ltclusterd.pid
# 3. rejoin试运行, new_primary_host为原备, 也就是新主的host, new_primary_
→port为新主端口号
ltcluster -f $LTDATA/../etc/ltcluster/ltcluster.conf node rejoin -d 'host=new_primary_
→host port=new_primary_port dbname=ltcluster user=ltcluster' --verbose --force-
→rewind --dry-run
# 4. 确认试运行成功,进入下一步
# 5. 正式执行rejoin, new_primary_host与new_primary_port同上
ltcluster -f $LTDATA/../etc/ltcluster/ltcluster.conf node rejoin -d 'host=new_primary_
→host port=new_primary_port dbname=ltcluster user=ltcluster' --verbose --force-rewind
# 6. 按本文档5.3.2.3所述,在新备上执行主备切换,恢复到最初的主备关系
# 7. 确认keepalived是否启动,若不存在则启动它,启动方法请参照本文档5.3
ps aux | grep keepalived
```

主节点修复后,如果能够正常 rejoin 回来固然好,但实际更多的时候是 rejoin 失败,这通常发生在 failover 后,备库提升为新主,然后经过了一段时间的数据写入,之后原主 rejoin (立刻 rejoin 一般不会有问题)。

在 rejoin 失败的情况下,可以在原主库上使用 clone 来重新初始化实例,步骤如下:

1. 确认LightDB已停止
2. 确认ltclusterd是否启动,若不存在则启动它
ps aux | grep ltcluster
ltclusterd -d -f `realpath \$LTDATA/../etc/ltcluster/ltcluster.conf` -p \$LTDATA/../etc/
→ltcluster/ltclusterd.pid

3. 清空实例目录下的内容,同时清空实例目录同级1t_*/1t_

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```
→users目录下内容(若有需要,清空前可先备份)
# 4. clone试运行, new_primary_host为原备, 也就是新主的host, new_primary_
→port为新主端口号
ltcluster -h new_primary_host -p new_primary_port -U ltcluster -d ltcluster -f
->SLTDATA/../etc/ltcluster/ltcluster.conf standby clone --dry-run
# 5. 确认试运行结果显示all prerequisites for "standby clone" are met
# 6. clone实例目录, new_primary_host与new_primary_port同上
ltcluster -h new_primary_host -p new_primary_port -U ltcluster -d ltcluster -f
\leftrightarrow $LTDATA/../etc/ltcluster/ltcluster.conf standby clone -F
# 7. 启动数据库
lt ctl -D $LTDATA start
# 8. 重新注册为standby
ltcluster -f $LTDATA/../etc/ltcluster/ltcluster.conf standby register -F
# 9. 按本文档5.3.2.3所述,在新备上执行主备切换,恢复到最初的主备关系
# 10. 确认keepalived是否启动,若不存在则启动它,启动方法请参照本文档5.3
ps aux | grep keepalived
```

备库故障恢复

备库发生故障后的恢复步骤如下:

```
# 1. 启动lightdb
lt_ctl -D $LTDATA start
# 2. 确认ltclusterd是否启动,若不存在则启动它
ps aux | grep ltcluster
ltclusterd -d -f `realpath $LTDATA/../etc/ltcluster/ltcluster.conf` -p $LTDATA/../etc/
→ltcluster/ltclusterd.pid
# 3. 确认keepalived是否启动,若不存在则启动它,启动方法请参照本文档5.3
ps aux | grep keepalived
```

集群数据复制 (replication) 级别

不同的业务场景对数据库主备一致性有不同的要求。一致性越高对性能影响越大。用户可通过配置 synchronous_commit 来达到不同级别的一致性。

```
# 同步模式,在主节点修改
synchronous_commit = 'on'
synchronous_standby_names = '*'
# 异步模式,在主节点修改
synchronous_commit = 'local'
synchronous_standby_names = ''
```

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```
# 修改后, 主节点调用reload生效
lt_ctl -D $LTDATA reload
```

下表概括了 synchronous_commit 不同设置对应不同的一致性级别:

synchrono us_commit 设置	本 地 提 交 持 久化	备库提交持久化 (数据库 崩溃)	备库提交持久化(OS 崩溃)	备 库 查 询 一致
remote_apply	是	是	是	是
on	是	是	是	
remote_write	是	是		
local	是			
off				

更详细的 synchronous_commit 及 synchronous_standby_names 请参考 LightDB 官方文档。

6 安装 LightDB 分布式版

6.1 LightDB 分布式三种部署模式简介

LightDB 分布式支持常规、多机单实例和单机多实例三种部署方式。

- •常规模式:1台服务器作为协调者节点,N(N>1)台服务器作为工作节点,每个节点都是高可用方式 部署,例如1个协调节点2个工作节点,每个节点都按1主1备方式部署,则需要6台服务器。如果 每个节点按照1主1备1witness部署,则需要9台服务器。
- 多机单实例:1台服务器作为协调者节点,N(N>1)台服务器作为工作节点,每个节点上均有一个数据库实例,且所有实例均按单机模式部署
- 单机多实例: 使用1台服务器同时安装协调者节点和工作节点的实例,且所有实例均按单机模式部署

注意:如果需要在生产环境使用 LightDB 分布式,则建议只使用常规模式,其余两种模式仅为测试、学习等 非生产环境提供。

6.2 安装分布式常规模式

GUI 安装

• 按前面所述要求, 配置 DISPLAY 环境变量, 在 install.sh 命令行提示信息中输入 yes, 按回车键确认, Windows 中就会弹出 GUI 安装向导界面。

```
[lightdb-x-13.8-23.1-10551-el7.x86_64] $ ./install.sh
Whether to use the graphical user interface (GUI, Make sure DISPLAY is configured, Such as [export DISPLAY=127.0.0.1:0
.0])?(Yes or No)
yes]
```

 界面中包含三个选项,选项一(默认选项) 仅安装数据库;选项二除了安装数据库外,还会生成一个 默认的实例目录,并使用默认实例启动数据库;选项三为开发者模式,该模式下将使用默认数据库参数,而不会对参数进行自动调优。



选择安装模式,提供单机版、高可用、分布式三个选项,默认为单机版,此处我们选择分布式。



选择分布式部署方式,包括常规(Normal mode)、多机单实例(Multi-server single instance)和单机多实例(Single server multi-instance)三种,关于这三种部署方式的定义,已经在本文档 6.1 小节中介绍过,这里不再赘述。本次我们选择常规模式,并使用 2 个工作节点,同时为每个工作节点部署 1 个 standby 节点。

LightDB Enterprise Postgres:	13.8-23.1 Installer - Step 3 of 16 - X
Distributed Mode	
A Configuration Option	
A Installation Mode	Normal mode
A Distributed Mode	Coordinator node or Worker node in this mode are composed of clusters. SSH encryption
 Install Location 	exemption must also be configured between servers.
 Configuration Server 	
Prerequisite Checks	Multi-server single instance
 Compatible Type 	This pattern is deployed to multiple servers, and only one instance can be added to each server.
 Database Process Type 	SSH encryption exemption must be configured between servers.
 Configuration Parameters 	
 Database Password 	Single server multi-instance
Summary	This pattern will be deployed on one machine and consists of multiple instances, including a
• Install	coordinator instance and multiple worker instances.
 Root Service 	
Check Service	
 Distributed Add Worker 	
Finish	

• 指定数据库安装目录和实例目录 (要确保 lightdb 用户有写入权限),(参考创建 LightDB 安装目录和实例 目录),可以在文本框中直接修改或点击 Browse 调出路径选择对话框,来指定其他目录。此外还可 以选择是否开启归档模式,默认开启。

Install

< Back

Cancel

LightDB Enterprise Postgres13	.8-23.1 Installer - St	tep 4 of 16			-	- ×
Location for Distributed Normal N	lode			1	S	E°
A Configuration Option						
A Installation Mode	Specify a path for	installing all LightDB software and storing configura	tion informati	on.		
A Distributed Mode						
Install Location						
 Configuration Server 	LightDB base:	/home/lightdb/stage	Browse			
 Prerequisite Checks 						
 Compatible Type 	Install Location: /	home/lightdb/stage/lightdb-x/13.8-23.1				
 Database Process Type 						
 Configuration Parameters 						
 Database Password 						
 Summary 						
Install	 Enable archive 					
 Root Service 						
Check Service						
 Distributed Add Worker 						
• Finish						
			< Back	Next >	Install	Cancel

• 部署协调者节点(Coordinator Node)高可用,点击 Add,在弹出的对话框中指定虚拟 IP 和端口号。

LightDB Enterprise Postgre	es13.8-23.1 Ir	nstaller - Step	5 of 16						- >
Configuration Server						Q	£.	1	
Configuration Option	- Sorrio								
Installation Mode	Serve		. /	in stan as leasting		welle		6-11	
Distributed Mode		name	vip/ip	Instance location	port	role	sync/a	Tallover	operate
 Install Location 	Distribu	uted Cluster							Add
 Configuration Server 									
Prerequisite Checks		LightDB	Enterprise Po	stgres Installer			\times		
Compatible Type			_			_			
Database Process Type		No	de Type: Co	ordinator Node		•			
Configuration Parameters									
Database Password		V	irtual lp: 10	20.148.10/24					
Summary						_			
Install		Instance L	.ocation: /hc	me/lightdb/stage/lightd	b-x/13.8	-2:			
Root Service			Dent: E4	22					
Check Service	<		Port: 54	02					
Distributed Add Worker							Add		
- prochowcea Aard Worker									

• 为协调者节点指定 primary 和 standby,此处操作步骤和 LightDB 高可用安装完全相同,详情请参考本文档第5章,此处及后续均不再赘述。

Configuration Server								E
Configuration Option							1	
N Installation Mode	Server							
Distributed Mode	name	vip/ip	instance location	port	role	sync/a	failover	opera
Install Location	 Distributed Cluster 	2						Add
Configuration Server	 Coordinator 	10.20.148.10/24	/home/lightdb/st	5432				Add De
Prerequisite Checks	Server	10.20.148.126/24			primary	none	none	Delete
Compatible Type	Server	10.20.148.122/24			standby	sync	yes	Delete
Database Process Type								
Configuration Parameters								
Database Password								
Summary								
Install								
Root Service								
Check Service	<							
Distributed Add Worker								
Finish								

• 部署第一个工作节点(Worker Node)的高可用,点击 Add,在弹出的对话框中指定虚拟 IP 和端口号,端口号可以与协调者节点相同,也可以不同。

LightDB Enterprise Postgre	es13.8-2	3.1 Installer - Step	5 of 16						_	\times
Configuration Server									A	11.9
Configuration Option										
Installation Mode	5	server								
Distributed Mode		name	vip/ip	instance location	port	role	sync/a	failover	op	era
Install Location	•	Distributed Cluste	e						Add	
Configuration Server		 Coordinator 	10.20.148.10/24	/home/lightdb/st	5432				Add	Del
Prerequisite Checks		5 LightDB Ei	nterprise Postgres I	nstaller			×	none	Delete	2
Compatible Type								yes	Delete	
Database Process Type		Node	Type: Worker No	de	*				Derett	<u> </u>
Configuration Parameters										
Database Password		Virt	tual Ip:							
Summary										
Install		Instance Loo	cation: /home/ligh	tdb/stage/lightdb-x/13	.8-2:					
Root Service										
Check Service	40		Port: 5432							3
Distributed Add Worker							Add			

• 为第一个工作节点指定 primary 和 standby。

Configuration Server				-	1		5	E	
 Configuration Option 									
Installation Mode	Server								
Distributed Mode	name	vip/ip	instance location	port	role	sync/a	failover	0	pe
Install Location	 Distributed Clu 							Add	
Configuration Server	 Coordinator 	10.20.148.10/24	/home/lightdb/st	5432				Add	[
Prerequisite Checks	Server	10.20.148.126/24			primary	none	none	Delet	e
Compatible Type	Server	10.20.148.122/24			standby	sync	yes	Delet	e
Database Process Type	 Worker Node 		/home/lightdb/st	5432				Add	
Configuration Parameters	Server	10 20 148 127/24			nrimary	none	none	Delet	
Database Password	Server	10.20.140.127/24			printary	none	none	Delet	e
Summary	Server	10.20.148.128/24			standby	sync	yes	Delet	e
Install									
Root Service									
Check Service	<								
Distributed Add Worker									
Finish									

• 按相同方法部署第二个工作节点的高可用。

Configuration Server					£		S?	
Configuration Option	Server							
Installation Mode	Server	s dim (lim	instance legation	nont	rele		faileur	
Distributed Mode	 Distributed Clu 	vip/ip	instance location	port	role	sync/a	Tallover	Add
Configuration Server	 Coordinator 	10.20.148.10/24	/home/lightdb/st	5432				Add
Prerequisite Checks	Server	10.20.148.126/24			primary	none	none	Delete
Compatible Type	Server	10.20.148.122/24			standby	sync	yes	Delete
Database Process Type	▼ Worker Node		/home/lightdb/st	5432				Add
Configuration Parameters	Server	10.20.148.127/24			primary	none	none	Delete
Database Password	Server	10.20.148.128/24			standby	sync	yes	Delete
Summary	 Worker Node 		/home/lightdb/st	5432				Add
Root Service	Server	10.20.149.228/24			primary	none	none	Delete
Check Service	Server	10 20 149 229/24			ctandhy	svnc	VAC	مسر
Distributed Add Worker	NU							/
Finish								

• 将安装包从当前服务器传输到其他机器上,这个过程可能需要几分钟时间,请耐心等待传输完成。

LightDB Enterprise Postgres:	13.8-23.1 Installer - Step 6 of 16				-	- ×
Perform Prerequisite Checks		C	1		S?	E?
 Configuration Option Installation Mode Distributed Mode Install Location Configuration Server Prerequisite Checks Compatible Type Database Process Type Configuration Parameters Database Password 	transfer package 10.20.148.122: start transfer 10.20.148.122: transfer finish! 10.20.148.127: start transfer 10.20.148.127: transfer finish! 10.20.148.128: start transfer					
 Summary Install Root Service Check Service Distributed Add Worker Finish 						
			< Back	Next >	Install	Cancel

• 检查每一台服务器的依赖包和 Linux 内核参数。如有依赖缺失,则无法进入下一步,必须先安装依赖, 再点击 Check Again 重新检查;如有内核参数与推荐配置不符的,则会给出 WARNING,此时可以 先按建议值重新配置,再点击 Check Again,也可以直接点击 Ignore All 忽略全部警告,直接 进入下一步。 LightDB Enterprise Postgres13.8-23.1 Installer - Step 6 of 16

Check Again

▼ Checks

▼ File Handler

Memory

file_max

shmmni

shmmax

shmall

swappiness

overcommit_memory

overcommit ratio

Checks

Ignore All

Status

Ok

Ok

Ok

Ok

Ok

Ok

War

Cancel

Current Value

< Back

524288

4096

5

2

50

8412581888

2053853

Perform Prerequisite Checks

- Configuration Option
- A Installation Mode
- A Distributed Mode
- Install Location
- Configuration Server
- Prerequisite Checks
- Compatible Type
- Database Process Type
- Configuration Parameters
- Database Password
- Summary
- Install
- Root Service
- Check Service
- Distributed Add Worker
- Finish

Total: 33 Ok: 27 Error: 0 Warning: 6 Ignore: 0 Unknown: 0

10.20.148.126 10.20.148.122 10.20.148.127 10.20.148.128 10.20.149.228 10.20.149.229

Recommended value

524288

4096

5

2

75

8412581888

2053853

• 选择数据库兼容模式

LightDB Enterprise Postgres	13.8-23.1 Installer - Step 7 of 16	- ×
Select Compatible Type		5 23
A Configuration Option		
A Installation Mode	LightDB	
A Distributed Mode	Compatible with PostareSOL	
 Install Location 		
 Configuration Server 		
 Prerequisite Checks 	Oracle	
Compatible Type	Compatible with Oracle	
 Database Process Type 		
 Configuration Parameters 	MySQL	
 Database Password 	Competible with MuSOI	
 Summary 	Compatible with MySQL	
 Install 		
 Root Service 		
Check Service		
 Distributed Add Worker 		
• Finish		
	< Back Next >	Install Cancel

• OLTP/OLAP 选择,该选项会影响部分 GUC 参数的默认值策略,默认为 OLTP,此处使用默认值。

Select Process Type Configuration Option Installation Mode Distributed Mode Install Location Configuration Server Prerequisite Checks Compatible Type Database Process Type Configuration Servers Database Process Type Configuration processing. OLAP is the primary application of data warehouse systems, supporting complex analytical operations, focusing on decision support, and providing intuitive and easy-to-understand query results. On-Line Analytical Processing. OLAP is the primary application of data warehouse systems, supporting complex analytical operations, focusing on decision support, and providing intuitive and easy-to-understand query results. Configuration Parameters Summary Install Root Service Distributed Add Worker Finish) LightDB Enterprise Postgre	s13.8-23.1 Installer - Step 8 of 16 $ \times$
 Configuration Option Installation Mode Installation Mode OLTP Distributed Mode On-Line Transaction Processing. OLTP is the primary application of traditional relational databases for basic, daily transactions, such as bank transactions Configuration Server Prerequisite Checks Compatible Type Database Process Type Configuration Parameters Database Password Summary Install Root Service Check Service Distributed Add Worker Finish 	Select Process Type	
 Installation Mode OLTP Distributed Mode Install Location Configuration Server Prerequisite Checks Compatible Type Database Process Type Configuration Parameters Database Password Summary Install Root Service Check Service Distributed Add Worker Finish 	A Configuration Option	
 A Distributed Mode On-Line Transaction Processing. OLTP is the primary application of traditional relational databases for basic, daily transactions Configuration Server Prerequisite Checks Compatible Type Database Process Type Configuration Parameters Database Password Summary Install Root Service Check Service Distributed Add Worker Finish 	A Installation Mode	OLTP
 Install Location Configuration Server Prerequisite Checks Compatible Type Database Process Type Configuration Parameters Database Password Summary Install Root Service Check Service Distributed Add Worker Finish Construction Processing. OLLP is the primary application of traditional relational databases for basic, daily transactions, such as bank transactions 	A Distributed Mode	On the Transmiss Processing OLTS is the original confliction of the division interview in the second second
 Configuration Server Prerequisite Checks Compatible Type Database Process Type Configuration Parameters Database Password Summary Install Root Service Distributed Add Worker Finish Oltap On-Line Analytical Processing. OLAP is the primary application of data warehouse systems, supporting complex analytical operations, focusing on decision support, and providing intuitive and easy-to-understand query results. 	 Install Location 	daily transactions, such as bank transactions
 Prerequisite Checks Compatible Type Database Process Type Configuration Parameters Database Password Summary Install Root Service Check Service Distributed Add Worker Finish 	 Configuration Server 	
 Compatible Type Database Process Type Configuration Parameters Database Password Summary Install Root Service Check Service Distributed Add Worker Finish 	 Prerequisite Checks 	OLAP
 Database Process Type Configuration Parameters Database Password Summary Install Root Service Check Service Distributed Add Worker Finish 	 Compatible Type 	On-Line Analytical Processing. OLAP is the primary application of data warehouse systems, supporting complex
Configuration Parameters Install Database Password Install Install Control Root Service Instributed Add Worker Distributed Add Worker Install	Database Process Type	analytical operations, focusing on decision support, and providing intuitive and easy-to-understand query results
 Database Password Summary Install Root Service Check Service Distributed Add Worker Finish 	 Configuration Parameters 	
Summary Install Root Service Check Service Distributed Add Worker Finish	 Database Password 	
 Install Root Service Check Service Distributed Add Worker Finish 	Summary	
 Root Service Check Service Distributed Add Worker Finish 	 Install 	
Check Service Distributed Add Worker Finish	 Root Service 	
Distributed Add Worker Finish	Check Service	
Finish	 Distributed Add Worker 	
	 Finish 	
< Bark Next > Install Cancel		< Back Next > Install Cancel

• 配置 shared_buffers 与 effective_cache_size 大小, 以及设置字符集。默认 shared_buffers = 25% * 总物理内存, 默认 effective_cache_size = 70% * 总物理内 存, 默认字符集为 UTF-8, 并提供 GBK、SQL_ASCII、LATIN1 三个其他选项。

LightDB Enterprise Postgre	s13.8-23.1 Installer - Step 9 of 2	L6		- ×
Configuration Parameters			1.	
A Configuration Option	memory character set			
A Installation Mode				
A Distributed Mode				
 Install Location 	shared_buffers(MB):		25%	
 Configuration Server 		1 8,023.5 16,045		
 Prerequisite Checks 	offective cache size/MP).	4011	70%	
 Compatible Type 	enective_cache_size(MB):	1 8,023.5 16,045		
 Database Process Type 		11231		
 Configuration Parameters 				
 Database Password 				
Summary				
Install				
 Root Service 				
Check Service				
 Distributed Add Worker 				
• Finish				
			< Back Next >	Install Cancel

LightDB Enterprise Postgres	13.8-23.1 Installer - Step 9 of 1	16			- ×
Configuration Parameters			0	- ST	50
A Configuration Option	memory character set				
A Installation Mode					
A Distributed Mode					
 Install Location 					
 Configuration Server 	Character set:	UTF8 👻			
 Prerequisite Checks 					
 Compatible Type 					
 Database Process Type 					
Configuration Parameters					
 Database Password 					
 Summary 					
 Install 					
 Root Service 					
Check Service					
 Distributed Add Worker 					
• Finish					
			. De alt		Connel
			< Back N	ext > Install	Cancel

• 配置 super 用户(即 lightdb)密码,密码长度为 6-16 个字符,且至少包含数字、英文字母,密码不支持以#开头。

LightDB Enterprise Postgres	13.8-23.1 Installer - Step 1	0 of 16				- ×
Set Password				0.0	1	
A Configuration Option						
A Installation Mode	Deserverd		٦			
A Distributed Mode	Password:	•••••				
 Install Location 			_			
 Configuration Server 	Confirm Password:	•••••				
 Prerequisite Checks 						
 Compatible Type 						
 Database Process Type 						
 Configuration Parameters 						
 Database Password 						
 Summary 						
• Install						
Root Service						
Check Service						
Distributed Add Worker						
Finish						
				< Back	Next > Inst	all Cancel

• LightDB 安装信息总览,可以点击 SAVE Response File 保存为文件。

LightDB Enterprise Postgres	13.8-23.1 Installer - Step 11 of 16	— ×
Summary		
 Configuration Option 	▼ LightDB Enterprise Installer	^
A Installation Mode	▼ Global Info	
A Distributed Mode	Base Location:	/home/lightdb/stage
 Install Location 	Home Location:	/home/lightdb/stage/lightdb-x/13.8-23.1
Configuration Server	Configuration Option:	INSTALL_AND_CREATE
Prerequisite Checks	User:	lightdb
Compatible Type	Password:	lightdb123
Database Process Type	LightDB Workload:	OLTP
Configuration Parameters	Deploy Mode:	DISTRIBUTED_CLUSTER
Database Password	Character Set:	UTF8
	Shared Buffers:	4GB
Summary	Effective Cache Size:	11GB
 Install 	Compatible Type:	LightDB
 Root Service 	▼ Server	
Check Service	 Coordinator Node 	10.20.148.10
Distributed Add Worker	<) >)
• Finish		Save Response File

< Back Next > Install Cancel

• 总览信息确认无误后,点击 Install 执行安装。

) LightDB Enterprise Postgr	es13.8-23.1 Installer - Step 12 of 16 $ imes$
Install	
A Configuration Option	installation progress
A Installation Mode	installation progress
A Distributed Mode	3%
Install Location	Check Itclusterd keepalived successful!
 Configuration Server 	[sh, /home/lightdb/lightdb-x-13.8-23.1-10551-el7.x86_64/script/ha/0.1.1_check_ltclusterd_keepalived.sh, witness 10.20.148.128.3_none_REMOTE_/home/lightdb/tage/lightdb-x/13.8-23.1
 Prerequisite Checks 	/home/lightdb/stage/lightdb-x/13.8-23.1/cluster/data, false]
 Compatible Type 	[sh, /home/lightdb/lightdb-x-13.8-23.1-10551-el7.x86_64/script/ha/1_install.sh, primary, 10.20.148.126, 1, none, LOCAL, /home/lightdb/lightdb-x-13.8-23.1-10551-el7.x86_64/, /home/lightdb/stage, 5432,
 Database Process Type 	13.8-23.1, lightdb123, DISTRIBUTED_CLUSTER]
 Configuration Parameters 	10.20.148.126, 1, none, LOCAL, /home/lightdb/stage/lightdb-x/13.8-23.1,
Database Password	/home/lightdb/stage/lightdb-x/13.8-23.1/cluster/data, 5432, lightdb, 10.20.148.126] [sh, /home/lightdb/lightdb-x-13.8-23.1-10551-el7.x86 64/script/ha/1 install.sh, standby, 10.20.148.127, 2,
Summary	sync, REMOTE, /home/lightdb/lightdb-x-13.8-23.1-10551-el7.x86_64/, /home/lightdb/stage, 5432, 13.8-23.1_lightdb123_DISTRIBUTED_CLUSTER1
• Install	
Root Service	
Check Service	LightDB
 Distributed Add Worker 	Leader of domestic financial database
Finish	
	< Back Next > Install Cancel

• 使用 ssh 客户端登录机器终端,切换到 root 用户,复制界面显示的命令并执行。执行的命令以实际 界面显示的为准。



	(接上页)
⇔conf	
# 启动 <i>ntp</i> 服务(在所有 sh /home/lightdb/lio /home/lightdb/stad	「主, 备, <i>witness</i> 上执行) ghtdb-x-13.8-23.1-10551-el7.x86_64/script/13_ntp_start.sh \ ge/lightdb-x/13.8-23.1
LightDB Enterprise Postgres1	3.8-23.1 Installer - Step 13 of 16 — X
Root Service	
A Configuration Option	
A Installation Mode	
A Distributed Mode	You need to run the following command to start keepalived as root.
 Install Location 	
 Configuration Server 	cd /home/lightdb/stage/lightdb-x/13.8-23.1/tools/bin ./keepalived -f /home/lightdb/stage/lightdb-x/13.8-23.1/etc/keepalived/keepalived.conf
 Prerequisite Checks 	sh /home/lightdh/lightdh-v-13 8-23 1-10551-el7 x86 64/script/13 ntn start sh
 Compatible Type 	/home/lightdb/stage/lightdb-x/13.8-23.1
 Database Process Type 	
 Configuration Parameters 	
 Database Password 	To execute the configuration command, do the following:
 Summary 	1. Open a terminal
• Install	2. Login as the root
Root Service	3. Run command
Check Service	4. Click next
 Distributed Add Worker 	
• Finish	
	< Back Next > Finish Cancel

启动 keepalived 程序后,使用 ps 查询一下进程,如果发现 keepalived 没有起来,则查看 keepalived 配置 文件中的对外网卡名称是否配置正确,这里需要配置您的机器对外的网卡名称。

• 检查分布式集群中各节点的 LightDB Database、keepalived 以及 NTP 是否均正确启动。

• 检测通过,点击 Finish 关闭安装向导。

LightDB Enterprise Postgres	13.8-23.1 Installer - Step 16 of 16			-	- ×
Finish				S?	Eo
Configuration Option					
Installation Mode	Install successfully.				
Distributed Mode					
Install Location					
Configuration Server					
Prerequisite Checks					
 Compatible Type 					
 Database Process Type 					
Configuration Parameters					
 Database Password 					
 Summary 					
• Install					
Root Service					
Check Service					
 Distributed Add Worker 					
• Finish					
		< Back	Next >	Finish	Cancel

命令行安装

٠

命令行安装步骤及选项与 GUI 安装完全相同,仅在向导信息提示上有所不同,因此本章节不再详细解释其中内容的含义与注意事项。

• 在 install.sh 命令行提示信息中输入 No, 按回车键确认, 进入命令行安装交互界面。

<pre>[lightdb-x-13.8-23.1-10551-el7.x86_64] \$./in: Whether to use the graphical user interface (0 0])?(Yes or No) no</pre>	stall.sh GUI, Make sure DISPLAY is configure	d, Such as [export DISPLAY=127.0.0.1:0.
选择配置模式,键入1仅安装数据库, 此处选择2。	键入2 会额外创建一个实例,	输入3为开发者选项,默认为1,
Choice a kind of configuration mode! 1: Only install. 2: Install database and Create instance. 3: Developer Please enter 1 2 or 3(The default is 1): 2		

 选择安装单机版、高可用或分布式, 键人1安装单机版, 键人2选择高可用版, 键人3安装分布式版, 默认为1, 此处选择3。

```
Choice a kind of install mode!
1: Single Mode.
2: High Availability Mode
3: Distributed Mode
Please enter 1, 2 or 3:(The default is 1)
```

•选择分布式常规、多机单实例、单机多实例部署方式。这里选择常规模式,并且使用与 6.2.1 小节相同 的节点数量与部署方式。 Please select distributed mode! Please enter distributed mode: 1 Normal mode; 2 Multi-server single instance; 3 Single server multi-instance.(Default 1)

• 指定 LightDB 安装目录 (要确保 lightdb 用户有写入权限)。

Please enter base location(The default is /usr/local/lightdb): /home/lightdb/stage Base Location: /home/lightdb/stage Install Location: /home/lightdb/stage/lightdb-x/13.8-23.1

• 配置协调者节点高可用。

Please enter coordinator node: Please enter a virtual IP address with network, such as (192.168.217.234/16):
10.20.148.10/24
The cluster need a primary server(required), one or more standby server(optional) and a witness server(optional). Please input a primary server ip which is actually the ip of the current server(required). such as (192.168.217.234/16): 10 20 148 126/24
Please input a standby server ip(required), such as (192.168.217.234/16): 10.20.148.122/24
Please enter status of the standby server [10.20.148.122] 1 sync:
2 async: 1
Please enter failover of the standby server [10.20.148.122] 1: yes 2: no
1 Continue to add standby nodes?(enter [exit] to left.): exit
Please input a witness server ip(optional), such as (192.168.217.234/16):
Witness is empty
Please enter a port of the cluster. (Default port 5432): 5432
Please enter instance location(The default is /home/lightdb/stage/lightdb-x/13.8-23.1/cluster):
Instance location: /home/lightdb/stage/lightdb-x/13.8-23.1/cluster
Vip: 10.20.148.10
Port: 5432
Ip: 10.20.148.126 Role: primary Status: none Failover: none
Ip: 10.20.148.122 Role: standby Status: sync Failover: yes

• 添加一个 work 节点,并且配置高可用。



• 添加第二个 work 节点,并且配置高可用。



• 配置 LightDB 是否开启归档模式,默认开启。



将安装包从当前服务器传输到其他机器上,这个过程可能需要几分钟时间,请耐心等待传输完成。传输完成后会检查依赖包和内核参数。

	Generate pg_hba ====================================
	Generate end ==================================
	Copying files takes time ====================================
10.20.148.122: start copy	
10.20.148.122: end copy	
10.20.148.127: start copy	
10.20.148.127: end copy	
10.20.148.128: start copy	
10.20.148.128: end copy	
10.20.149.228: start copy	
10.20.149.228: end copy	
10.20.149.229: start copy	
10.20.149.229: end copy	
	Copying files end ===================================



• 选择数据库兼容模式。

Choice a kind of Compatible Type! 1: LightdDB(Compatible with PostgreSQL). 2: ORACLE(Compatible with ORACLE). 3: MYSQL(Compatible with MYSQL). Please enter 1, 2 or 3:(The default is 1)

•选择 OLTP/OLAP, 键入 1 为 OLTP, 键入 2 为 OLAP, 默认为 1。

Choice a kind of LightDB workload! 1: OLTP(On-line Transaction Processing). 2: OLAP(On-Line Analytical Processing). Please enter 1 or 2:(The default is 1)

• 配置 shared_buffers 与 effective_cache_size 大小,以及设置字符集。

Please configure memory(MB) and character set! Please enter shared_buffers, Default value is (4011): Please enter effective_cache_size, Default value is (11231): Please choice a kind of Character Set. 1. UTF8 2. GBK 3. SQL_ASCII 4. LATIM1 The default choice 1(UTF8)

• 设置 super 用户密码, 键入时密码不可见, 密码长度为 6-16 个字符, 且至少包含数字、英文字母, 密码 不支持以 # 开头。

Please enter LightDB password! Please enter original password: Please enter confirm password:

•选择继续安装,直至安装完成,然后选择一台服务器作为 NTP 服务器,此处使用默认值。

• 使用 root 用户, 在协调者节点的 primary 和 standby 上执行界面提示的启动 keepalived 的命令 (所有工作节点不需执行)。启动 ntp 的命令需要在所有机器上执行。



启动 keepalived 程序后,使用 ps 查询一下进程,如果发现 keepalived 没有起来,则查看 keepalived 配置 文件中的对外网卡名称是否配置正确,这里需要配置您的机器对外的网卡名称。

• 上一步骤中的命令执行完成后,按任意键进入检查过程,检查通过后会输出 Install Finish 信息, 并自动退出安装向导。

6.3 安装分布式多机单实例模式

GUI 安装

• 按前面所述要求, 配置 DISPLAY 环境变量, 在 install.sh 命令行提示信息中输入 yes, 按回车键确认, Windows 中就会弹出 GUI 安装向导界面。

[lightdb-x-13.8-23.1-10551-el7.x86_64] \$./install.sh
Whether to use the graphical user interface (GUI, Make sure DISPLAY is configured, Such as [export DISPLAY=127.0.0.1:0
.0])?(Yes or No)
yes]

 界面中包含三个选项,选项一(默认选项) 仅安装数据库;选项二除了安装数据库外,还会生成一个 默认的实例目录,并使用默认实例启动数据库;选项三为开发者模式,该模式下将使用默认数据库参数,而不会对参数进行自动调优。



•选择安装模式,提供单机版、高可用、分布式三个选项,默认为单机版,此处我们选择分布式版。



• 选择分布式部署方式,包括常规(Normal mode)、多机单实例(Multi-server single instance)和单机多实例(Single server multi-instance)三种,关于这三种部署方式的定义,已经在本文档 6.1 小节中介绍过,这里不再赘述。本次我们选择多机单实例模式,并使用 2 个工作节点。

🕥 LightDB Enterprise Postgr	es13.8-23.1 Installer - Step 3 of 16 $ \times$
Distributed Mode	
A Configuration Option	
A Installation Mode	Normal mode
A Distributed Mode	Coordinator node or Worker node in this mode are composed of clusters. SSH encryption
Distributed Single Server	exemption must also be configured between servers
Prerequisite Checks	exemption nusculso be configured between servers.
Compatible Type	Multi-server single instance
 Database Process Type 	This pattern is deployed to multiple servers, and only one instance can be added to each server.
 Database Install Location 	SSH encryption exemption must be configured between servers.
 Configuration Parameters 	
Database Password	Single server multi-instance
Summary	This pattern will be deployed on one machine and consists of multiple instances, including a
Install	coordinator instance and multiple worker instances.
Root Service	
Check Service	
LVS Options	
Finish	

Install Cancel

< Back

• 点击 Add, 添加 1 个协调者节点和 2 个工作节点的 IP 与端口号。

Distributed Single Server			· ···	No Star
Configuration Option	Comun			
Installation Mode	Server	i		
Distributed Mode	name	IP	port	operate
Distributed Single Server	 Distributed Cluster 			Add
Prerequisite Checks	Coordinator Node	10.20.148.126	5432	Delete
Compatible Type	Worker Node	10.20.148.127	5432	Delete
Database Process Type	Worker Node	10.20.148.128	5432	Delete
Database Install Location				Belete
Configuration Parameters				
Database Password				
Summary				
Install				
Root Service				
Check Service				
LVS Options				
Finish				

• 将安装包从当前服务器传输到其他机器上,这个过程可能需要几分钟时间,请耐心等待传输完成。

LightDB Enterprise Postgre	es13.8-23.1 Installer - Step 5 of 16		-	- ×
Perform Prerequisite Checks			57	E?
A Configuration Option				
A Installation Mode	transfer package			
A Distributed Mode	10 20 148 127: start transfer			
 Distributed Single Server 				
Prerequisite Checks				
 Compatible Type 				
 Database Process Type 				
 Database Install Location 				
 Configuration Parameters 				
 Database Password 				
 Summary 				
Install				
 Root Service 				
Check Service				
 LVS Options 				
• Finish				
		Pack Novts	Install	Cancel
		DOLK NEXT >	mstall	Cancel

• 检查每一台服务器的依赖包和 Linux 内核参数。如有依赖缺失,则无法进入下一步,必须先安装依赖, 再点击 Check Again 重新检查;如有内核参数与推荐配置不符的,则会给出 WARNING,此时可以 先按建议值重新配置,再点击 Check Again,也可以直接点击 Ignore All 忽略全部警告,直接 进入下一步。

LightDB Enterprise Postgres:	13.8-23.1 Installer - Step 5 of 16			- ×
Perform Prerequisite Checks				STE.
A Configuration Option				
A Installation Mode	10.20.148.126 10.20.148.127	10.20.148.128		
A Distributed Mode				Ignore All
 Distributed Single Server 	Check Again			Ignore All
Prerequisite Checks	Checks	Recommended value	Current Value	Status
 Compatible Type 	▼ Checks			Â
 Database Process Type 	▼ File Handler			
 Database Install Location 	file_max	524288	524288	Ok
 Configuration Parameters 	 Memory 			
 Database Password 	shmmni	4096	4096	Ok
 Summary 	shmmax	8412581888	8412581888	Ok
• Install	shmall	2053853	2053853	Ok
Root Service	swappiness	5	5	Ok
Chack Service	overcommit_memory	2	2	Ok
	overcommit ratio	75	50	Warning
 LVS Options 	Total: 33 Ok: 27 Error: 0 Warnin	ng: 6 Ignore: 0 Unknown: 0	0	
 Finish 				

Install Cancel

< Back

• 选择兼容模式

LightDB Enterprise Postgr	es13.8-23.1 Installer - Step 6 of 16			-	- ×
Select Compatible Type				S?	Eo
A Configuration Option					
A Installation Mode	LightDB				
A Distributed ModeDistributed Single Server	Compatible with PostgreSQL				
 Prerequisite Checks 					
Compatible Type	Oracle				
 Database Process Type 	Compatible with Oracle				
 Database Install Location 					
Configuration Parameters	MySOL				
 Database Password 	Compatible with McCOI				
Summary	Compatible with MySQL				
 Install 					
 Root Service 					
Check Service					
 LVS Options 					
 Finish 					
		< Back	Next >	Install	Cancel

• OLTP/OLAP 选择,该选项会影响部分 GUC 参数的默认值策略,默认为 OLTP,此处使用默认值。

🦻 LightDB Enterprise Postgr	res13.8-23.1 Installer - Step 7 of 16 - X
Select Process Type	
A Configuration Option	
A Installation Mode	OLTP
 Distributed Mode Distributed Single Server	On-Line Transaction Processing. OLTP is the primary application of traditional relational databases for basic, daily transactions, such as bank transactions
 Prerequisite Checks 	
 Compatible Type 	OLAP
 Database Process Type 	On-Line Analytical Processing. OLAP is the primary application of data warehouse systems, supporting complex
 Database Install Location 	analytical operations, focusing on decision support, and providing intuitive and easy-to-understand query results.
 Configuration Parameters 	
 Database Password 	
 Summary 	
 Install 	
 Root Service 	
Check Service	
 LVS Options 	
Finish	
	< Back Rext > Install Cancel

• 指定数据库安装目录和实例目录 (要确保 lightdb 用户有写入权限),(参考创建 LightDB 安装目录和实例 目录),可以在文本框中直接修改或点击 Browse 调出路径选择对话框,来指定其他目录。此外还可 以选择是否开启归档模式,默认开启。

LightDB Enterprise Postgres1	3.8-23.1 Installer - St	tep 8 of 16			_	- ×
Installation Location					5	
 Configuration Option Installation Mode Distributed Mode Distributed Single Server 	Specify a path for i instance, the insta	installing all LightDB software and storing configura nce directory is automatically generated.	tion informatio	on. If you r	eed to ins	tall an
 Prerequisite Checks 	LightDB base:	/home/lightdb/stage	Browse			
Compatible TypeDatabase Process Type	Install Location: /h	ome/lightdb/stage/lightdb-x/13.8-23.1				
Database Install Location Configuration Parameters Database Parameter	LightDB Instance:	/home/lightdb/stage/lightdb-x/13.8-23.1/cluster	Browse			
SummaryInstall	✓ Enable archive					
Root Service						
Check Service						
 LVS Options 						
Finish						
			< Back	Next >	Install	Cancel

• 配置 shared_buffers 与 effective_cache_size 大小, 以及设置字符集。默认 shared_buffers = 25% * 总物理内存, 默认 effective_cache_size = 70% * 总物理内存, 默认字符集为 UTF-8, 并提供 GBK、SQL_ASCII、LATIN1 三个其他选项。

LightDB Enterprise Postgres	s13.8-23.1 Installer - Step 9 of 1	16				- ×
Configuration Parameters				1		5.
A Configuration Option	memory character set					
A Installation Mode						
A Distributed Mode						
 Distributed Single Server 	shared_buffers(MB):		1 1 1	25%		
 Prerequisite Checks 		1 8,023.5	16,045			
 Compatible Type 	offective cache size/MD).	4011		70%		
 Database Process Type 	enective_cache_size(MB):	1 8,023.5	16,045			
 Database Install Location 		11231				
 Configuration Parameters 						
 Database Password 						
 Summary 						
 Install 						
 Root Service 						
Check Service						
 LVS Options 						
Finish						
				< Back	levt > In	stall Cancel
				< DOCK	SAL - III	Cancer

LightDB Enterprise Postgres	13.8-23.1 Installer - Step 9 of 1	6			-	- ×
Configuration Parameters					53	E?
A Configuration Option	memory character set					
A Installation Mode						
A Distributed Mode						
 Distributed Single Server 						
 Prerequisite Checks 	Character set:	UTF8 🔻				
 Compatible Type 						
 Database Process Type 						
 Database Install Location 						
 Configuration Parameters 						
 Database Password 						
Summary						
 Install 						
 Root Service 						
Check Service						
 LVS Options 						
• Finish						
			< Back	Next >	Install	Cancel

• 配置 super 用户(即 lightdb)密码,密码长度为 6-16 个字符,且至少包含数字、英文字母(不限制大小写),密码不支持以 # 开头。

LightDB Enterprise Postgre	s13.8-23.1 Installer - Step 1	0 of 16				-	- ×
Set Password						5	Eo
A Configuration Option							
A Installation Mode	Descent						
A Distributed Mode	Password:	•••••					
 Distributed Single Server 			_				
 Prerequisite Checks 	Confirm Password:	•••••					
 Compatible Type 							
 Database Process Type 							
 Database Install Location 							
 Configuration Parameters 							
Database Password							
Summary							
 Install 							
Root Service							
Check Service							
 LVS Options 							
• Finish							
				< Back	Next >	Install	Cancel

• LightDB 安装信息总览,可以点击 SAVE Response File 保存为文件。

LightDB Enterprise Postgres	s13.8-23.1 Installer - Step 11 of 16				-	- ×	(
Summary		0	E		ST.		0
A Configuration Option	▼ LightDB Enterprise Installer						$\hat{\Box}$
A Installation Mode	▼ Global Info						
A Distributed Mode	Base Location:	/home/lightdb/stage					
 Distributed Single Server 	Home Location:	/home/lightdb/stage/lightdb-x/13.8-2	23.1				
Prerequisite Checks	Configuration Option:	INSTALL_AND_CREATE					
 Compatible Type 	User:	lightdb					
 Database Process Type 	Password:	lightdb123					
 Database Install Location 	LightDB Workload:	OLTP					
 Configuration Parameters 	Deploy Mode:	DISTRIBUTED_CLUSTER					
 Database Password 	Character Set:	01F8					
Summary	Effective Cache Size:	11GB					
 Install 	Compatible Type:	LightDB					
Root Service	▼ Server						
Check Service	 Computer 	10.20.148.126					~
 LVS Options 	<[>
 Finish 					Save Resp	ponse Fil	е
		<	< Back	Next >	Install	Cancel	

• 总览信息确认无误后,点击 Install 执行安装。

LightDB Enterprise Postgres	:13.8-23.1 Installer - Step 12 of 16	- ×
Install		S 23
A Configuration Option	installation progress	
A Installation Mode		
A Distributed Mode		
 Distributed Single Server 		
 Prerequisite Checks 		
 Compatible Type 		
 Database Process Type 		
 Database Install Location 		
 Configuration Parameters 		
 Database Password 		
Summary		
• Install		
Root Service		
Check Service		🔄 LightDB
 LVS Options 	Leader of domest	ic financial database
• Finish		
	< Back Next >	Install Cancel

• 安装完成后,选择一台服务器作为 NTP 服务器,此处使用默认值。

Ntp server				1 de		E.
Configuration Option						
Installation Mode	Enter the ip addre	ss or domain name of the	ntp server, Allowed to chang	e.		
Distributed Mode						
 Distributed Single Server 	Nto Server:	10 20 148 126				
Prerequisite Checks	http berten.					
 Compatible Type 						
 Database Process Type 						
 Database Install Location 						
 Configuration Parameters 						
 Database Password 						
Summary						
Install						
Ntp server						
Root Service						
Check Service						
LVS Options						
• Finish						

• 使用 root 用户,在所有协调者节点和工作节点上执行界面中提示的命令以启用 NTP 服务,然后点击 Next。

Root Service		
Configuration Option		
N Installation Mode		
N Distributed Mode	You need to run the following command to start keepalived as root.	
Distributed Single Server		
Prerequisite Checks	sh /home/lightdh/lightdh x 12 8 22 1 10551 ol7 x86 64/csrint/12 nto start sh	
Compatible Type	/home/lightdb/stage/lightdb-x/13.8-23.1	
Database Process Type		
Database Install Location		
Configuration Parameters		
Database Password		
Summary	To execute the configuration command, do the following:	
Install	1. Open a terminal	
Ntp server	2. Login as the root	
Root Service	3. Run command 4. Click next	
Check Service		
LVS Options		
Finish		

• 这里提示是否安装 LVS,本次安装是单 CN 模式,不需要安装 LVS,直接选择否。

LVS Options Configuration Option Installation Mode Distributed Mode Distributed Single Server Prerequisite Checks Compatible Type Database Process Type Database Install Location Configuration Parameters 	~
 Configuration Option Installation Mode Choose whether to install LVS options to load balance coordinator node. Distributed Mode Not install LVS Not install LVS Installator Install LVS Install LVS Install LVS Install LVS Install LVS Install LVS Compatible Type Database Process Type Database Install Location Configuration Parameters 	00
Installation Mode Choose whether to install LVS options to load balance coordinator node. Distributed Mode Install LVS Distributed Single Server Install LVS Prerequisite Checks Install LVS Compatible Type Install LVS Database Process Type Install LOCation Configuration Parameters Install EVS	
A Distributed Mode Not install LVS Distributed Single Server Install LVS Prerequisite Checks Install LVS Compatible Type Install LVS Database Process Type Install LVS Database Install Location Install LVS	
 Distributed Single Server Prerequisite Checks Compatible Type Database Process Type Database Install Location Configuration Parameters 	
 Prerequisite Checks Install LVS Compatible Type Database Process Type Database Install Location Configuration Parameters 	
Compatible Type Database Process Type Database Install Location Configuration Parameters	
Database Process Type Database Install Location Configuration Parameters	
Database Install Location Configuration Parameters	
Configuration Parameters	
~	
Database Password	
Summary	
Install	
Ntp server	
Root Service	
Check Service	
LVS Options	
Finish	
< Back Next > Finish Ca	incel

• 检测通过,点击 Finish 关闭安装向导。

LightDB Enterprise Postgree	es13.8-23.1 Installer - Step 17 of 17			-	- ×
Finish				53	E °
A Configuration Option					
A Installation Mode	Install successfully.				
A Distributed Mode					
 Distributed Single Server 					
Prerequisite Checks					
 Compatible Type 					
 Database Process Type 					
 Database Install Location 					
 Configuration Parameters 					
 Database Password 					
Summary					
• Install					
 Ntp server 					
Root Service					
 Check Service 					
 LVS Options 					
• Finish					
		a Provide		R1-1-L	0
		< Back	Next >	Finish	Cancel

命令行安装

命令行安装步骤及选项与 GUI 安装完全相同,仅在向导信息提示上有所不同,因此本章节不再详细解释其中内容的含义与注意事项。

• 在 install.sh 命令行提示信息中输入 No, 按回车键确认, 进入命令行安装交互界面。

```
[lightdb-x-13.8-23.1-10551-el7.x86_64] $ ./install.sh
Whether to use the graphical user interface (GUI, Make sure DISPLAY is configured, Such as [export DISPLAY=127.0.0.1:0.
0])?(Yes or No)
no|
```

 选择配置模式,键人1 仅安装数据库,键人2 会额外创建一个实例,输入3 为开发者选项,默认为1, 此处选择2。

```
Choice a kind of configuration mode!
1: Only install.
2: Install database and Create instance.
3: Developer
Please enter 1 2 or 3(The default is 1):
```

 选择安装单机版、高可用或分布式, 键人1安装单机版, 键人2选择高可用版, 键人3安装分布式版, 默认为1, 此处选择3。

```
Choice a kind of install mode!
1: Single Mode.
2: High Availability Mode
3: Distributed Mode
Please enter 1, 2 or 3:(The default is 1)
```

 选择分布式常规、多机单实例、单机多实例部署方式。这里选择多机单实例模式,并且使用与 6.3.1 小 节相同的节点数量与部署方式。

```
Please select distributed mode!
Please enter distributed mode:
1 Normal mode;
2 Multi-server single instance;
3 Single server multi-instance.(Default 1)
```

• 分别配置协调者节点和工作节点

```
Configure the directory and port for the single-node multi-instance.

Please enter coordinator node:

Please enter the ip of coordinator node, such as 192.168.217.234:

10.20.148.126

Please enter the port of coordinator node. (Default port 5432):

Please enter worker node:

Please enter the ip of worker node, such as 192.168.217.234:

10.20.148.127

Please enter the port of worker node. (Default port 5432):

Please enter the ip of worker node. (Default port 5432):

Please enter the ip of worker node, such as 192.168.217.234:

10.20.148.128

Please enter the port of worker node. (Default port 5432):
```

• 将安装包从当前服务器传输到其他机器上,这个过程可能需要几分钟时间,请耐心等待传输完成。



• 检查依赖包与 Linux 内核参数。



• 选择数据库兼容模式。

Choice a kind of Compatible Type! 1: LightdDB(Compatible with PostgreSQL). 2: ORACLE(Compatible with ORACLE). 3: MYSQL(Compatible with MYSQL). Please enter 1, 2 or 3:(The default is 1)

•选择 OLTP/OLAP, 键入1为 OLTP, 键入2为 OLAP, 默认为1。

Choice a kind of LightDB workload! 1: OLTP(On-line Transaction Processing). 2: OLAP(On-Line Analytical Processing). Please enter 1 or 2:(The default is 1)

• 指定 LightDB 安装目录和实例目录 (要确保 lightdb 用户有写入权限)。

Specify a path for installing all LightDB software and storing configuration information. Please enter base location(The default is /usr/local/lightdb): /home/lightdb/stage Base Location: /home/lightdb/stage/lightdb-x/13.8-23.1 Please enter instance location(The default is /home/lightdb/stage/lightdb-x/13.8-23.1/cluster): Instance location: /home/lightdb/stage/lightdb-x/13.8-23.1/cluster

• 选择是否开启归档模式,默认开启。并配置 shared_buffers 与 effective_cache_size 大小,以及设置字符集。



• 设置 super 用户密码, 键入时密码不可见, 密码长度为 6-16 个字符, 且至少包含数字、英文字母, 密码 不支持以 # 开头。

Please enter LightDB password! Please enter original password: Please enter confirm password:

• 选择继续安装,直至安装完成

Do you want to deploy immediately?(Yes or No, The default is yes) yes [>>>>>>>>>>>>]100%

• 使用 root 用户,在所有协调者节点和工作节点上执行界面中提示的命令以启用 NTP 服务,然后按任 意键继续

Ntp Server Enter the ip address or domain name of the ntp server, Allowed to change.(Default ntp ip:10.20.148.126) Execute follow commands as root Execute follow commands to start ntp:

- sh /home/lightdb/lightdb-x-13.8-23.1-10551-el7.x86_64/script/13_ntp_start.sh /home/lightdb/stage/lightdb-x/13.8-23.1
- 提示安装 LVS,本次安装是单 CN 模式,不需要安装 LVS,直接选择否。

Choose whether to install LVS to load balance coordinator node ?(Yes or No,The default is no)

6.4 安装分布式单机多实例模式

GUI 安装

• 按前面所述要求, 配置 DISPLAY 环境变量, 在 install.sh 命令行提示信息中输入 yes, 按回车键确认, Windows 中就会弹出 GUI 安装向导界面。

[lightdb-x-13.8-23.1-10551-el7.x86_64] \$./install.sh Whether to use the graphical user interface (GUI, Make sure DISPLAY is configured, Such as [export DISPLAY=127.0.0.1:0 .0])?(Yes or No) yes|

 界面中包含三个选项,选项一(默认选项) 仅安装数据库;选项二除了安装数据库外,还会生成一个 默认的实例目录,并使用默认实例启动数据库;选项三为开发者模式,该模式下将使用默认数据库参数,而不会对参数进行自动调优。



选择安装模式,提供单机版、高可用、分布式三个选项,默认为单机版,此处我们选择分布式。



• 选择分布式部署方式,包括常规(Normal mode)、多机单实例(Multi-server single instance)和单机多实例(Single server multi-instance)三种,关于这三种部署方式的定义,已经在本文档 6.1 小节中介绍过,这里不再赘述。本次我们选择单机多实例模式,并使用 2 个工作节点。

LightDB Enterprise Postgres	513.8-23.1 Installer - Step 3 of 14 - X
Distributed Mode	
A Configuration Option	
A Installation Mode	O Normal mode
A Distributed Mode	Coordinator node or Worker node in this mode are composed of clusters. SSH encryption
 Prerequisite Checks 	exemption must also be configured between servers.
 Compatible Type 	
 Database Process Type 	Multi-server single instance
Install Location	This pattern is deployed to multiple servers, and only one instance can be added to each server.
Configuration Instance	SSH encryption exemption must be configured between servers.
 Configuration Parameters 	Single server multi-instance
 Database Password 	This pattern will be deployed on one machine and consists of multiple instances, including a
 Summary 	coordinator instance and multiple worker instances.
 Install 	
 LVS Options 	
• Finish	

• 检查依赖包和 Linux 内核参数。如有依赖缺失,则无法进入下一步,必须先安装依赖,再点击 Check Again 重新检查;如有内核参数与推荐配置不符的,则会给出 WARNING,此时可以先按建议值重新 配置,再点击 Check Again,也可以直接点击 Ignore All 忽略全部警告,直接进入下一步。

< Back

Install Cancel

LightDB Enterprise Postgres1	.3.8-23.1 Installer - Step 4 of 14			—	\times
Perform Prerequisite Checks					
Configuration Option					
Installation Mode	10.20.148.232				
Distributed Mode	Chock Again			lanore /	All
Prerequisite Checks	Check Again				
Compatible Type	Checks	Recommended value	Current Value	Status	
Database Process Type	▼ Checks				ŕ
Install Location	▼ File Handler				
Configuration Instance	file_max	524288	524288	Ok	
Configuration Parameters	▼ Memory	1000	1000		
Database Reserverd	shmmni	4096	4096	OK	
	shmall	2053853	2053853	Ok	
Summary	swappiness	5	5	Ok	
Install	overcommit memory	2	2	Ok	
LVS Options	overcommit ratio	75	50	Warning	1
Finish	Total: 32 Ok: 27 Error: 0 Warn	ing: 5 Ignore: 0 Unknown:	D		
			< Back Next >	Install Ca	ncel

• 选择数据库兼容模式

LightDB Enterprise Postgro	es13.8-23.1 Installer - Step 5 of 14			_	- ×
Select Compatible Type		0		S?	E °?
A Configuration Option					
A Installation Mode	LightDB				
A Distributed Mode	Compatible with PostgreSQL				
 Prerequisite Checks 					
Compatible Type	Oracle				
 Database Process Type 					
 Install Location 	compatible with Oracle				
Configuration Instance					
 Configuration Parameters 	MySQL				
 Database Password 	Compatible with MySQL				
 Summary 					
 Install 					
 LVS Options 					
• Finish					
		< Back	Next >	Install	Cancel

• OLTP/OLAP 选择,该选项会影响部分 GUC 参数的默认值策略,默认为 OLTP,此处使用默认值。

LightDB Enterprise Postgres	13.8-23.1 Installer - Step 6 of 14 - X
Select Process Type	
A Configuration Option	
A Installation Mode	OLTP
A Distributed Mode	On-Line Transaction Processing. OLTP is the primary application of traditional relational databases for basic.
Prerequisite Checks	daily transactions, such as bank transactions
Compatible Type	OLAP
Database Process Type	
 Install Location 	On-Line Analytical Processing. OLAP is the primary application of data warehouse systems, supporting complex analytical operations, focusing on decision support, and providing intuitive and easy-to-understand guery
 Configuration Instance 	results.
 Configuration Parameters 	
Database Password	
Summary	
Install	
 LVS Options 	
Finish	
	< Back Next > Install Cancel

• 指定数据库安装目录和实例目录 (要确保 lightdb 用户有写入权限),(参考创建 LightDB 安装目录和实例 目录),可以在文本框中直接修改或点击 Browse 调出路径选择对话框,来指定其他目录。此外还可 以选择是否开启归档模式,默认开启。

LightDB Enterprise Postgres	13.8-23.1 Installer - S	tep 7 of 14			- ×
Location for Single Server Mult	i Instance			1	5
Configuration Option Installation Mode Distributed Mode	Specify a path for	installing all LightDB software and storing configura	ation informatio	on.	
Prerequisite Checks			_		
 Compatible Type 	LightDB base:	/home/lightdb/stage	Browse		
 Database Process Type 	Install Location:	/home/lightdb/stage/lightdb-x/13.8-23.1			
Install Location	instan Location.	home/lightab/stage/lightab-x/15.0-25.1			
 Configuration Instance 					
 Configuration Parameters 					
 Database Password 					
Summary	🗸 Enable archive	2			
Install					
LVS Options					
Finish					
			< Back	Next > Insta	Cancel

• 点击 Add,依次添加协调者节点和工作节点的实例目录与端口号,各个节点的端口号不能相同。

Configuration Instance		Ū.		
Configuration Option	Server			
Installation Mode	name	instance location	port	onorato
 Distributed Mode Prerequisite Checks Compatible Type Database Process Type Install Location Configuration Instance Configuration Parameters Database Password Summary Install LVS Options Finish 	 Distributed Cluster Coordinator Node Worker Node Worker Node 	/home/lightdb/stage/lightdb-x/13.8-23.1/cluster1 /home/lightdb/stage/lightdb-x/13.8-23.1/cluster2 /home/lightdb/stage/lightdb-x/13.8-23.1/cluster3	5432 5433 5434	Add Delete Delete

• 配置 shared_buffers 与 effective_cache_size 大小, 以及设置字符集。默认 shared_buffers = 25% * 总物理内存, 默认 effective_cache_size = 70% * 总物理内存, 默认字符集为 UTF-8, 并提供 GBK、SQL_ASCII、LATIN1 三个其他选项。

< Back

Install

Cancel

Configuration Parameters			ST &
Configuration Option Installation Mode Distributed Mode Prerequisite Checks Compatible Type Database Process Type Install Location Configuration Instance Configuration Parameters Database Password Summary Install LVS Options Finish	memory character set shared_buffers(MB): 25% i 8,023.5 16,045 4011 70% i 8,023.5 16,045 i 8,023.5 16,045 i 1 8,023.5 16,045 i 1 8,023.5 16,045		
LightDB Enterprise Postgree	< Back s13.8-23.1 Installer - Step 9 of 14	Next >	Install C
Configuration Option Installation Mode Distributed Mode Prerequisite Checks	memory character set Character set: UTF8		

• 配置 super 用户(即 lightdb)密码,密码长度为 6-16 个字符,且至少包含数字、英文字母(不限制大小写),密码不支持以 # 开头。

LightDB Enterprise Postgres1	3.8-23.1 Installer - Step 10	0 of 14				_	- ×
Set Password						S?	Es.
A Configuration Option							
A Installation Mode	Password:		1				
A Distributed Mode	rassword.						
 Prerequisite Checks 			1				
 Compatible Type 	Confirm Password:]				
 Database Process Type 							
 Install Location 							
 Configuration Instance 							
 Configuration Parameters 							
Database Password							
 Summary 							
• Install							
 LVS Options 							
Finish							
				< Back	Next >	Install	Cancel

• LightDB 安装信息总览,可以点击 SAVE Response File 保存为文件。

Ŋ LightDB Enterprise Postgres	13.8-23.1 Installer - Step 11 of 14		— ×
Summary			
A Configuration Option	▼ LightDB Enterprise Installer		
A Installation Mode	▼ Global Info		
A Distributed Mode	Base Location:	/home/lightdb/stage	
 Prerequisite Checks 	Home Location:	/home/lightdb/stage/lightdb-x/13.8-23.1	
Compatible Type	Configuration Option:	INSTALL_AND_CREATE	
	User:	lightdb	
Database Process Type	Password:	lightdb123	
Install Location	LightDB Workload:	OLTP	
 Configuration Instance 	Deploy Mode:	DISTRIBUTED_CLUSTER	
 Configuration Parameters 	Character Set:	UTF8	
 Database Password 	Shared Buffers:	4GB	
Summary	Effective Cache Size:	11GB	
Install	Compatible Type: ▼ Server	LightDB	
 LVS Options 	▼ Computer	10.20.148.232	
• Finish	< (> ×
			Save Response File
		< Back Next >	Install Cancel

• 总览信息确认无误后,点击 Install 执行安装。
LightDB Enterprise Postgres13.8-23.1 Installer - Step 12 of 14 Install A Configuration Option installation progress A Installation Mode A Distributed Mode Prerequisite Checks Compatible Type Database Process Type Install Location Configuration Instance Configuration Parameters Database Password Summary • Install LightDB LVS Options ulah Finish

< Back Next > Install Cancel

• 安装完成后,会提示安装 LVS,我们这个安装形式不需要 LVS,选择不安装。

LightDB Enterprise Postgres	s13.8-23.1 Installer - Step 13 of 14	- ×
LVS Options		
A Configuration Option		
A Installation Mode	Choose whether to install LVS options to load balance coordinator node.	
A Distributed Mode	Not install LVS	
 Prerequisite Checks 		
 Compatible Type 	O Install LVS	
 Database Process Type 		
 Install Location 		
 Configuration Instance 		
 Configuration Parameters 		
 Database Password 		
 Summary 		
Install		
LVS Options		
Finish		
		inter Connect
	< Back Next > Fir	lish Cancel

• 安装成功

LightDB Enterprise Postgres:	13.8-23.1 Installer - Step 14 of 14			-	- ×
Finish				57	E.
A Configuration Option					
A Installation Mode	Install successfully.				
A Distributed Mode					
Prerequisite Checks					
Compatible Type					
 Database Process Type 					
 Install Location 					
Configuration Instance					
Configuration Parameters					
Database Password					
Summary					
• Install					
 LVS Options 					
• Finish					
		< Back	Next >	Finish	Cancel

命令行安装

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命令行安装步骤及选项与 GUI 安装完全相同,仅在向导信息提示上有所不同,因此本章节不再详细解释其中内容的含义与注意事项。

• 在 install.sh 命令行提示信息中输入 No, 按回车键确认, 进入命令行安装交互界面。

<pre>[lightdb-x-13.8-23.1-10551-el7.x86_64] \$./install.sh Whether to use the graphical user interface (GUI, Make sure DISPLAY is configured, Such as [export DISPLAY=127.0.0.1:0 0])?(Yes or No) no </pre>	0.
选择配置模式,键入1仅安装数据库,键入2会额外创建一个实例,输入3为开发者选项,默认为此处选择2。	1,
Choice a kind of configuration mode! 1: Only install. 2: Install database and Create instance. 3: Developer Please enter 1 2 or 3(The default is 1): 2	
选择安装单机版、高可用或分布式,键入1安装单机版,键入2选择高可用版,键入3安装分布式版	į,

 选择安装单机版、高可用或分布式,键人1安装单机版,键人2选择高可用版,键人3安装分布式版, 默认为1,此处选择3。

```
Choice a kind of install mode!
1: Single Mode.
2: High Availability Mode
3: Distributed Mode
Please enter 1, 2 or 3:(The default is 1)
```

•选择分布式常规、多机单实例、单机多实例部署方式。这里选择单机多实例模式,并且使用与 6.4.1 小 节相同的节点数量与部署方式。 Please select distributed mode! Please enter distributed mode: 1 Normal mode; 2 Multi-server single instance; 3 Single server multi-instance.(Default 1)

• 指定实例目录 (要确保 lightdb 用户有写入权限),并依次添加协调者节点和工作节点的端口号,各个节点的端口号不能相同。



• 配置 LightDB 是否开启归档模式,默认开启。



• 检查依赖包与 Linux 内核参数。



• 选择数据库兼容模式。

Choice a kind of Compatible Type! 1: LightdDB(Compatible with PostgreSQL). 2: ORACLE(Compatible with ORACLE). 3: MYSQL(Compatible with MYSQL). Please enter 1, 2 or 3:(The default is 1)

•选择 OLTP/OLAP, 键入 1为 OLTP, 键入 2为 OLAP, 默认为 1。

Choice a kind of LightDB workload! 1: OLTP(On-line Transaction Processing). 2: OLAP(On-Line Analytical Processing). Please enter 1 or 2:(The default is 1)

• 配置 shared_buffers 与 effective_cache_size 大小,以及设置字符集。



 设置 super 用户密码,键入时密码不可见,密码长度为 6-16 个字符,且至少包含数字、英文字母,密码 不支持以 # 开头。

Please enter LightDB password! Please enter original password: Please enter confirm password:

• 输入 yes 开始正式安装。

```
Do you want to deploy immediately?(Yes or No, The default is yes)
yes
[>>>>>>>>>>>]100%
```

• 安装完成后,会提示安装 LVS,我们这个安装形式不需要 LVS,选择不安装。 Choose whether to install LVS to load balance coordinator node ?(Yes or No,The default is no) no Install Finish

7 卸载

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7.1 界面卸载

•进入 LightDB 安装目录下的 uninstall 目录,对于本文档演示所用的范例来说就是/home/ lightdb/stage/uninstall。

<pre>[lightdb-x-13.8-23.1-10551-el [uninstall] \$ ls lightdb-uninstaller-13.8-23.1</pre>	7.x86_64] \$ cd /home/lightdb/stage/uninstall/ .jar script uninstallFile.json uninstall.sh
配置 DISPLAY 环境变量	,运行 uninstall.sh 卸载脚本,输入 yes 选择 GUI 卸载。
[uninstall] \$./uninstall.sh Whether to use the graphical use yes	er interface (GUI, Make sure DISPLAY is configured, Such as [export DISPLAY=127.0.0.1:0.0])?(Yes or No)
有三个卸载选项,仅卸载 实例,此处选择全部卸载	载数据库实例、仅卸载数据库与 LightDB EM、全部卸载,默认为仅卸载数据库载。
LightDB Enterprise Postgres	uninstaller - Step 1 of 5 - X
LightDB Enterprise Postgres Un	installer
A LightDB Uninstall Option	
 Uninstall Server 	Uninstall Instance
 Summary 	Only delete instances.
 Uninstall 	
 Finish 	Uninstall Database /home/lightdb/stage/lightdb-x/13.8-23.1
	Delete database.
	🔘 Uninstall All

• 以 LightDB 分布式卸载为例,如下图所示,若想保留某个节点不卸载,可点击 Delete 将其从卸载列 表中去除,之后还可以通过 Add Server 将其重新添加回来。

Uninstall Cancel

< Back

Delete instances and database.

LightDB Enterprise Postgr	res uninstaller - Step 2 of 5				- ×
Uninstall Server					
A LightDB Uninstall Option	Useb Aveilebility Mede				
Uninstall Server	High Availability Mode				
Summary	Add Server ip address		add		
 Uninstall 	Server				
• Finish	in	operate			
	10.20.148.126	Delete	~		
	10.20.148.122	Delete			
	10.20.148.127	Delete			
	10.20.148.128	Delete			
	10 20 1 /0 2 28	······································	~		
			< Back	Next >	Uninstall Cancel

•确认卸载信息,无误后点击 Uninstall 执行卸载。

🦻 LightDB Enterprise Postg	res uninstaller - Step 3 of 5	- ×
Summary		
 LightDB Uninstall Option Uninstall Server Summary Uninstall Finish 	 LightDB Database Summary LightDB Uninstall Info Uninstall type Address: Base Location: Home Location: 	Uninstall all 10.20.148.126,10.20.148.122,10.20.148.127,10.20.148.128,10.20.149.2 /home/lightdb/stage /home/lightdb/stage/lightdb-x/13.8-23.1

< Back Next > Uninstall Cancel

• 等待卸载完成。

Uninstall		
LightDB Uninstall Option Uninstall Server Summary Uninstall Finish	uninstallation progress	
	Reduct of domestic financial	htD Jataba Canc
〔击 finish 退出。 ⑨ LightDB Enterprise Postg	es uninstaller - Step 5 of 5 —	
〔击 finish 退出。 り LightDB Enterprise Postg Finish	es uninstaller - Step 5 of 5	

- 如果是高可用环境,则使用 root 账号登录主,备停止 keepalived 进程。
- 如果是通过 LightDB 安装的 NTP 服务,则使用 root 账号登录主,备, witness 停止 ntp 进程。

7.2 命令行卸载

•进入 LightDB 安装目录下的 uninstall 目录,对于本文档演示所用的范例来说就是/home/ lightdb/stage/uninstall。

[lightdb-x-13.8-23.1-10551-el7.x86_64] \$ cd /home/lightdb/stage/uninstall/ [uninstall] \$ ls lightdb-uninstaller-13.8-23.1.jar script uninstallFile.json uninstall.sh

• 配置 DISPLAY 环境变量,运行 uninstall.sh 卸载脚本,输入 no 选择命令行卸载。

[uninstall] \$./uninstall.sh Whether to use the graphical user interface (GUI, Make sure DISPLAY is configured, Such as [export DISPLAY=127.0.0.1:0.0])?(Yes or No) no

 有三个卸载选项, 仅卸载数据库实例、仅卸载数据库、全部卸载 (数据库和实例), 默认为仅卸载数据 库实例

[lightdb⊜hs-10-20-148-126 uninstall]\$./uninstall.sh Whether to use the graphical user interface (GUI, Make sure DISPLAY is configured, Such as [export DISPLAY=127.0.0.1:0.0])?(Yes or No) no Please select uninstall options(The default is 1). 1. Uninstall instance(Only delete instances); 2. Uninstall database(Delete database); 3. Uninstall all(Delete instances and database).

• 以 LightDB 分布式卸载为例,选择 3 继续 (可以使用 Delete 移除某些不想卸载的主机)

```
Server operations.

The current servers which will be uninstalled:

10.20.148.126

10.20.148.127

10.20.148.127

10.20.148.128

10.20.149.228

10.20.149.229

Select the server operation(The default is 1):

1: Add server;

2: Delete server;

3: Exit actions.
```

• 检测到有 LightDB 实例,二次提示是否确定卸载(请注意核查,避免数据被误删除)。

```
Check LightDB:
The lightDB process exists. Are you sure to uninstall it? (yes or no, default no)
ves!
```

• 等待卸载完成。

```
Jninstall now!(Yes or No, The default is yes):
yes
[>>>>>>>]100%[lightdb@hs-10-20-148-126 uninstall]$
```

- 如果是高可用环境,则使用 root 账号登录主,备停止 keepalived 进程。
- 如果是通过 LightDB 安装的 NTP 服务,则使用 root 账号登录主,备,witness 停止 ntp 进程。

8 安装 LightDB-X 客户端

8.1 命令行安装

• 将 LightDB-X client 安装包拷贝到服务器的安装目录下,对于本文档演示所用的范例来说安装包是 lightdb-x-client-13.8-23.2-12177-el7.x86_64.zip, 安装目录是 /root。

```
[root@localhost ~] # 1s
anaconda-ks.cfg Desktop Documents Downloads lightdb-x-client-13.8-23.2-12177-
→el7.x86_64.zip Music original-ks.cfg Pictures Public Templates Videos
[root@localhost ~] #
[root@localhost ~] # pwd
/root
[root@localhost ~] #
```

• 解压 LightDB-X client 安装包。

• cd 到 LightDB-X client 解压后生成的目录中,本例中就是 lightdb-x-client-13.8-23. 2-12177-e17.x86_64 目录, bin 目录中存放的就是客户能够使用的脚本和可执行文件, lib 目录 存放的是被依赖的 so 文件。

```
[root@localhost ~]# ls lightdb-x-client-13.8-23.2-12177-el7.x86_64
bin lib
[root@localhost ~]#
```

• 使 用 bin 中 提 供 的 lt_distributed_dump.py、lt_distributed_restore.py、 lt_distributed_probackup.py 脚本, 依赖 python3, 如果本地没有安装, 则需要安装 python3 环境。

centos7默认不安装,执行下面的命令安装python3 sudo yum install -y python3

• 配置环境变量。

```
export LTHOME=/root/lightdb-x-client-13.8-23.2-12177-e17.x86_64
export PATH=${LTHOME}/bin:${PATH}
export LD_LIBRARY_PATH=${LTHOME}/lib:${LD_LIBRARY_PATH}
```

• 以上步骤都执行成功,则 LightDB-X client 安装成功。