



# 金融行业数据库架构变迁

**2016年11月2日星期三**

# What a DBA ?



优化网站数据库



对开发人员进行培训



网站架构调整



数据库硬件性能压力测试



自动化数字化运维平台



数据库安全



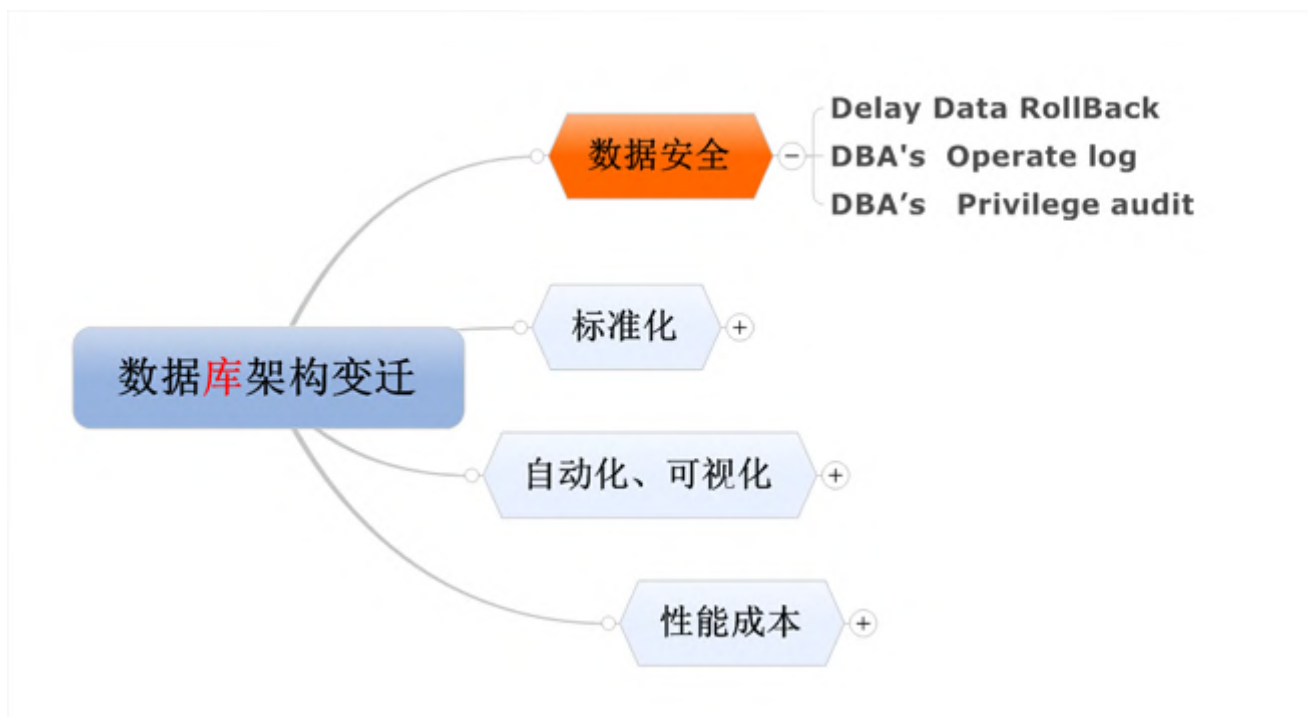
# What a DBA ?



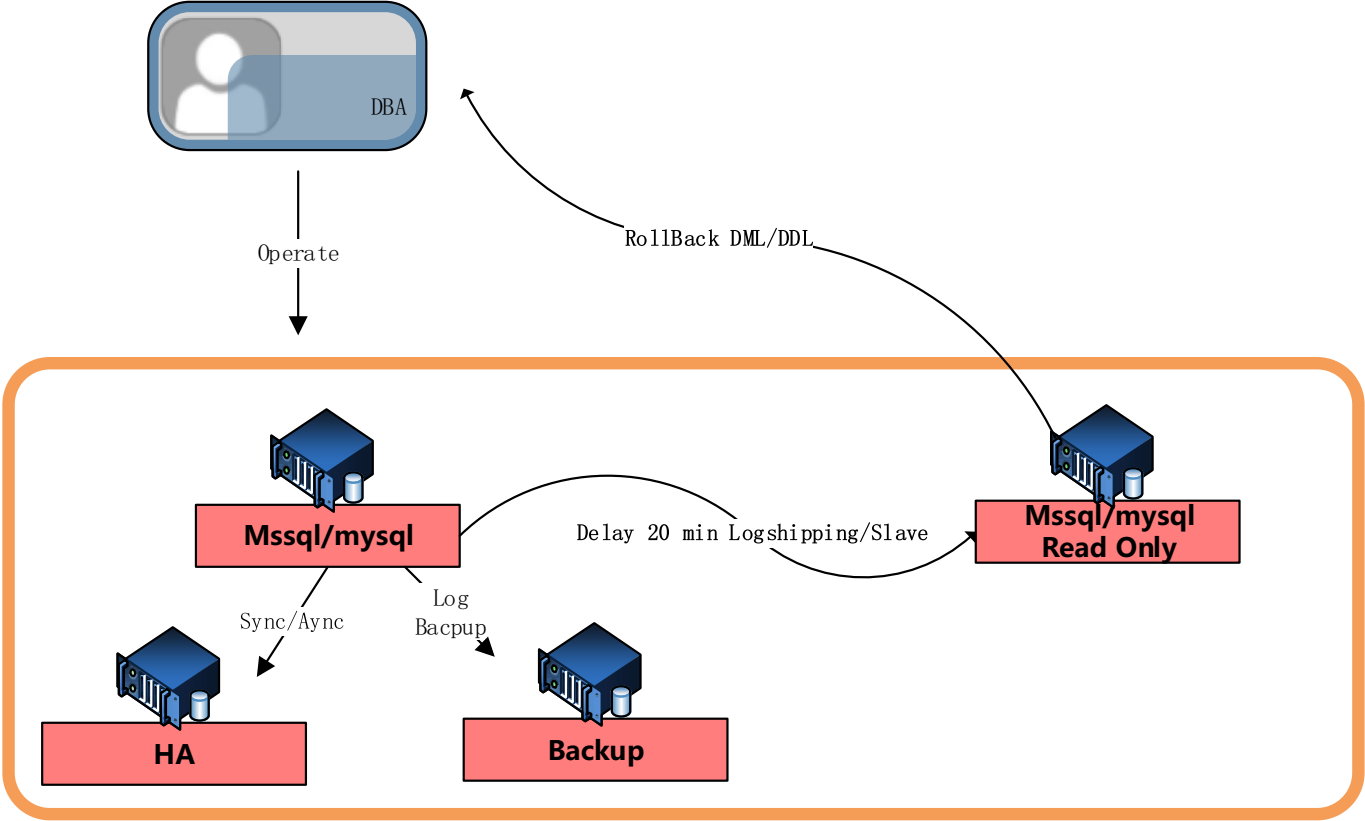
归纳为：

- 数据安全
- 标准化
- 自动化可视化
- 性能成本

# 数据安全



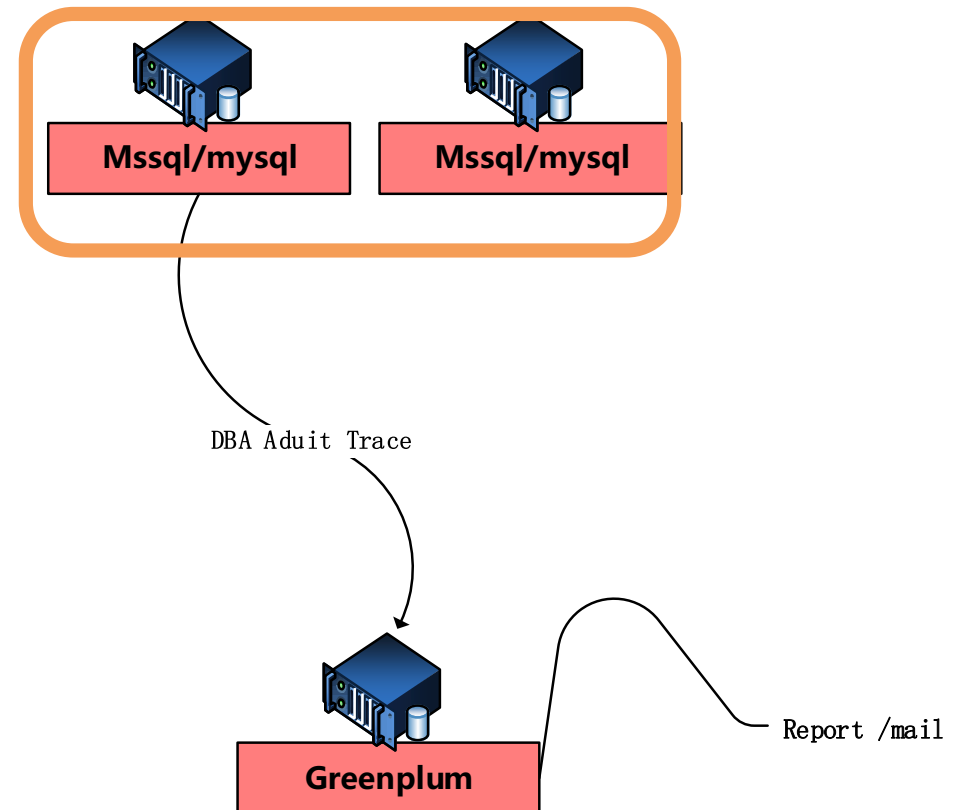
# Delay Data RollBack



# DBA's Operate Log



- 记录DBA操作，提供审计功能
- 支持 BI 血缘系统
- 特殊操作分类提醒



# DBA's Operate Log



## SQLServerDBABehaviorMonitor

WindowsIP:172.17.10.65 ServerName:172.17.10.65 TotalSum:85

WindowsIP:172.17.10.65 ServerName:172.17.10.65\_2433 LoginName:DBA\_ TotalSum:85 DateScope:20161009 - 20161009

Trace Date	Data Base Name	Client Host Name	Application Name	Text Data	Start Time	End Time
20161009	DBCenter	DB040DL360	Microsoft SQL Server Management Studio	SELECT (@@microsoftversion / 0x1000000) & 0xff AS [VersionMajor], (@@microsoftversion / 0x10000) & 0xff AS [VersionMinor], @@microsoftversion & 0xffff AS [BuildNumber]	2016/10/9 10:28:40	2016/10/9 10:28:40
20161009	DBCenter	DB040DL360	Microsoft SQL Server Management Studio	SELECT dtb.name AS [Name] FROM master.sys.databases AS dtb ORDER BY [Name] ASC	2016/10/9 10:28:10	2016/10/9 10:28:10
20161009	DBCenter	DB040DL360	Microsoft SQL Server Management Studio	SELECT dtb.name AS [Name] FROM master.sys.databases AS dtb ORDER BY [Name] ASC	2016/10/9 10:28:10	2016/10/9 10:28:10
20161009	DBCenter	DB040DL360	Microsoft SQL Server Management Studio	SELECT dtb.name AS [Name] FROM master.sys.databases AS dtb ORDER BY [Name] ASC	2016/10/9 10:28:39	2016/10/9 10:28:39

# DBA's Operate Log



2016/10/19 08:41:18.07  
dbmonitor@  
ServerMssqlAudit\_Alert:1

事件: [REDACTED]  
此邮件的重要性的: 高。

EventType	PostTime	DatabaseName	ObjectName	LoginName	OWNER	Manager
CREATE_TABLE	2016-10-09 16:57:21	ppdai_pay_1	BatchOperationDB	dbmonitor	QiaoHongbao	YiQing

**CommandText**  
CREATE TABLE [dbo].[BatchOperation] ([BatchOperationID] [bigint] IDENTITY(1,1) NOT NULL, [IsActive] [bit] NOT NULL DEFAULT ((1)), [InsertTime] [datetime] NOT NULL DEFAULT (getdate()), [UpdateTime] [datetime] NOT NULL DEFAULT (getdate()), CONSTRAINT [PK\_BatchOperation] PRIMARY KEY CLUSTERED ([BatchOperationID] ASC) WITH (PAD\_INDEX = OFF, STATISTICS\_NORECOMPUTE = OFF, IGNORE\_DUP\_KEY = OFF, ALLOW\_ROW\_LOCKS = ON, ALLOW\_PAGE\_LOCKS = ON) ON [PRIMARY]) ON [PRIMARY] /\* Owner: QiaoHongbao; Manager: YiQing \*/

EventType	PostTime	DatabaseName	ObjectName	LoginName	OWNER	Manager
CREATE_TABLE	2016-10-09 16:57:21	ppdai_pay_1	BatchOperationDetailDB	dbmonitor	QiaoHongbao	YiQing

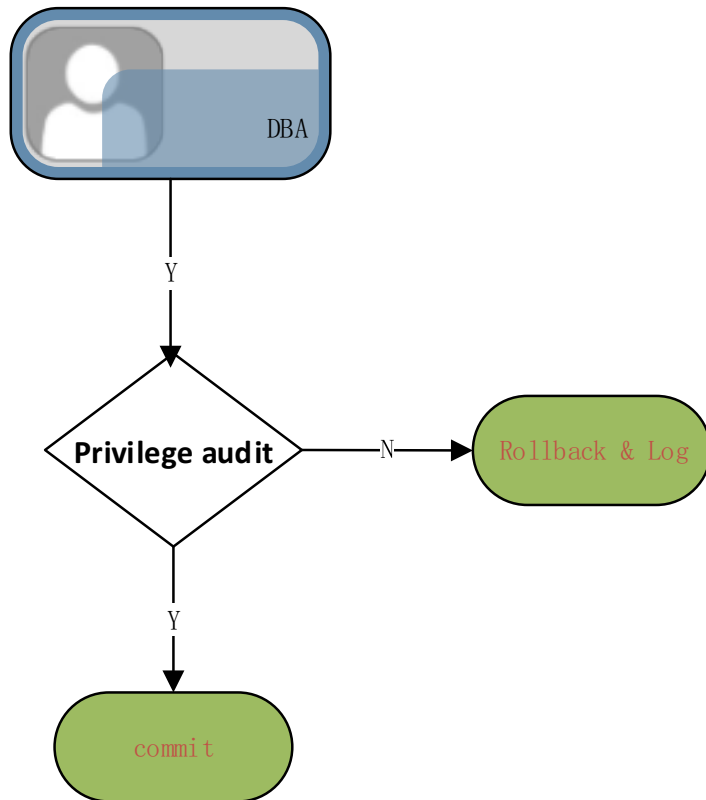
**CommandText**  
CREATE TABLE [dbo].[BatchOperationDetail] ([BatchOperationDetailID] [bigint] IDENTITY(1,1) NOT NULL, [OperationBatchID] [bigint] NOT NULL, [TradeID] [bigint] NOT NULL, [OperateType] [int] NOT NULL, [Status] [int] NOT NULL DEFAULT ((0)), [IsActive] [bit] NOT NULL DEFAULT ((1)), [InsertTime] [datetime] NOT NULL DEFAULT (getdate()), [UpdateTime] [datetime] NOT NULL DEFAULT (getdate()), CONSTRAINT [PK\_BatchOperationDetail] PRIMARY KEY CLUSTERED ([BatchOperationDetailID] ASC) WITH (PAD\_INDEX = OFF, STATISTICS\_NORECOMPUTE = OFF, IGNORE\_DUP\_KEY = OFF, ALLOW\_ROW\_LOCKS = ON, ALLOW\_PAGE\_LOCKS = ON) ON [PRIMARY]) ON [PRIMARY] /\* Owner: QiaoHongbao; Manager: YiQing \*/

EventType	PostTime	DatabaseName	ObjectName	LoginName	OWNER	Manager
CREATE_TABLE	2016-10-09 16:57:22	ppdai_pay_tr	LoanOperationLog	dbmonitor	QiaoHongbao	YiQing

**CommandText**  
CREATE TABLE [dbo].[LoanOperationLog] ([LogID] [bigint] IDENTITY(1,1) NOT NULL, [TradeID] [bigint] NOT NULL, [OperateType] [int] NOT NULL, [CommandJSON] [nvarchar](max) NOT NULL, [NotifyChannelBatch] [nvarchar](64) NULL, [Creator] [nvarchar](64) NULL, [Modifier] [nvarchar](64) NULL, [IsActive] [bit] NOT NULL DEFAULT ((1)), [InsertTime] [datetime] NOT NULL DEFAULT (getdate()), [UpdateTime] [datetime] NOT NULL DEFAULT (getdate()), [OperationBatchID] [bigint] NOT NULL DEFAULT ((0)), [CallerDescriptor] [varchar](128) NULL, CONSTRAINT [PK\_LoanOperationLog] PRIMARY KEY CLUSTERED ([LogID] ASC) WITH (PAD\_INDEX = OFF, STATISTICS\_NORECOMPUTE = OFF, IGNORE\_DUP\_KEY = OFF, ALLOW\_ROW\_LOCKS = ON, ALLOW\_PAGE\_LOCKS = ON) ON [PRIMARY]) ON [PRIMARY] TEXTIMAGE\_ON [PRIMARY] /\* Owner: QiaoHongbao; Manager: YiQing \*/



# DBA's Privilege audit



## 审核规范示例：

- Create table 必须要有主键，主键长度 $\leq 20$ 字节，必须包含column comment、dev\_owner
- Drop table 必须先改名，再删除
- 字段中包含 varchar(max) nvarchar(max) Text、image 会提示
- 个人用户账号高频次登录失败会提示并禁用账号
- .....

# DBA's Privilege audit



SQLQuery7.s... jin (103)\*\* SQLQuery5.s... jin (201)\*\* SQLQuery4.s... ngjin (84)\*\* EventData1.xml SQLQuery2.s... ngjin (80)\*\*

```

drop table [dbo].[bankcitys]

USE [ppdai_Deposit_Repl]
GO

/***** Object: Table [dbo].[bankcitys]  Script Date: 10/11/2016 02:24:23 *****/
SET ANSI_NULLS ON
GO
SET QUOTED_IDENTIFIER ON
GO

CREATE TABLE [dbo].[bankcityssays] (
  [BankCityId] [int] IDENTITY(1,1) NOT FOR REPLICATION NOT NULL,
  [CityName] [nvarchar] (20) NOT NULL,
  [ProvinceId] [int] NOT NULL,
  CONSTRAINT [PK_oss#bankcitys] PRIMARY KEY CLUSTERED
  (
    [BankCityId] ASC
  ) WITH (PAD_INDEX = OFF, STATISTICS_NORECOMPUTE = OFF, IGNORE_DUP_KEY = OFF, ALLOW_ROW_LOCKS = ON, ALLOW_PAGE_LOCKS = ON) ON [PRIMARY]
) ON [PRIMARY]
GO
    
```

消息

(1 行受影响)  
 xuwangjin Please Rename bankcitys Then Drop it; eg: Rename a to A\_del\_20161011;  
 消息 50000, 级别 1, 状态 1  
 消息 3609, 级别 16, 状态 2, 第 1 行  
 事务在触发器中结束。批处理已中止。

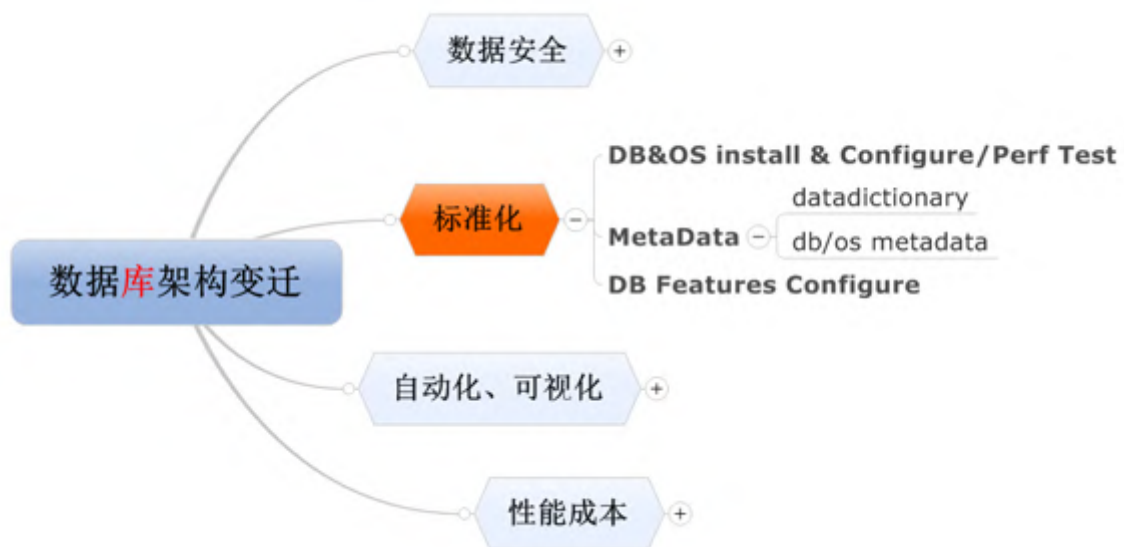
消息

Create table: bankcityssays Please indicate the Owners and Manager of this table!  
 消息 50000, 级别 1, 状态 1  
 消息 3609, 级别 16, 状态 2, 第 2 行  
 事务在触发器中结束。批处理已中止。

DBCenter\_SqlLogAlert (DateTime:2016-10-11 02:30:24)

SERVERNAME	logtype	LogDate	ProcessInfo	Text	Time
DB044DL580	sqlserver	2016-10-11T02:03:27.650	登录	错误: 18456, 严重性: 14, 状态: 38。	2016-10-11 02:30:24
DB044DL580	sqlserver	2016-10-11T02:03:27.650	登录	Login failed for user 'dba_kettle', 原因: 无法打开明确指定的数据库。 [客户端: <local machine>]	2016-10-11 02:30:24
DB044DL580	sqlserver	2016-10-11T02:11:38.060	spid124	ppdai_RiskLevel..._RiskLevel_AllExecute failed: 对象名 'ppdai_Deposit_Repl.dbo.bankaccounts' 无效。	2016-10-11 02:30:24

# 标准化



# DB&OS Install &Configure/Per Test



数据库安  
装

操作系统  
加固

性能压测

- 数据库一键安装
  - Mysql
  - Mssql
- 操作系统加固
  - Linux
  - Windows
- 性能压测
  - Mysql
    - Sysbench
    - mysqlslap
  - Mssql
    - Sqlio
    - Ostress
    - Sqlsim
    - Diskspd

# DB&OS Install &Configure/Per Test



Sqlo.zip

名称	修改日期	类型	大小
sqlo_Result	2015/12/4 19:35	文件夹	
EULA.rtf	2004/1/21 17:12	RTF 文件	35 KB
param.txt	2015/12/4 19:27	TXT 文件	1 KB
readme.txt	2008/11/30 10:17	TXT 文件	23 KB
ResultAnalysis.ps1	2015/12/4 8:05	PS1 文件	4 KB
sqlo.exe	2001/10/10 16:03	应用程序	178 KB
SQLIO.ps1	2015/12/4 19:25	PS1 文件	12 KB
SQLIO_cmd.bat	2015/12/4 8:31	Windows 批处理...	1 KB
SQLIO工具说明.doc	2015/8/27 17:50	Microsoft Word ...	13 KB

具体测试步骤:

1. 打开 SQLIO.PS1 文档, 可更改具体压测的参数

压测时间, 压测的文件大小, 压测的 IO 块大小以及 **不需压测的盘**

```
## 指定线程的数量, 最大值 256
$T_Count = 2
## 指定测试执行时间, 单位: 秒
$S_Count = 3600
## 指定未处理 I/O 请求数量, 也就是请求 Queue 的深度
$IQ_Count = 1
## 初始化文件大小, 单位: 字节
$I_Size = 20480
## 指定 I/O 请求的块大小, 单位: Kbytes
$IQ_Count = "64", "32", "64", "32", "16", "8", "4"
## 制定 TestFile 文件路径
$DeviceID = Get-WmiClass Win32_LogicalDisk | Where {$_.DriveType -eq 3 -and #('C:', 'D:') -notin $_.Drive} | Select-Object DriveLetter
```

测试的时间 (单位: 秒)

压测的文件大小

压测的 IO 块大小

不压测的盘

SqloSim.rar 中包含 4 个文件

名称	修改日期	类型	大小
SQIOSIM.COM	2010/4/3 0:12	MS-DOS 应用程序	245 KB
SQIOSIM.EXE	2010/4/3 18:00	应用程序	837 KB
sqlosim.ps1	2015/11/20 13:51	PS1 文件	2 KB
sqlosim_cmd.bat	2015/11/20 13:50	Windows 批处理...	1 KB

右击 sqlosim\_cmd.bat

名称	修改日期	类型	大小
SQIOSIM.COM	2010/4/3 19:00	应用程序	837 KB
sqlosim.ini	2015/11/20 13:55	配置文件	4 KB
sqlosim.ps1	2015/11/20 13:51	Windows PowerShell 脚本文件	2 KB
sqlosim_cmd.bat	2015/11/20 13:50	Windows 批处理...	1 KB

生成文件 errorlog、simlog.xml(压测报告)、sqlosim.ini(压测配置)

名称	修改日期	类型	大小
errorlog.txt	2015/11/20 13:55	TXT 文件	4 KB
simlog.xml	2015/11/20 13:57	XML 文档	52 KB
SQIOSIM.COM	2010/4/3 0:12	MS-DOS 应用程序	245 KB
SQIOSIM.EXE	2010/4/3 19:00	应用程序	837 KB
sqlosim.ini	2015/11/20 13:55	配置文件	4 KB
sqlosim.ps1	2015/11/20 13:51	Windows PowerShell 脚本文件	2 KB
sqlosim_cmd.bat	2015/11/20 13:50	Windows 批处理...	1 KB



# Meta Data-Datadictionary



## MSSQL Data Dictionary

WindowsIP: [redacted] 数据库IP: [redacted]

记录条数: 5157 占用空间: 0.19MB 所属人: 业务负责人:

数据库名称	架构名称	表名称	表描述	创建时间	字段序号	字段名称	字段描述	数据类型	默认值	是否允许为空	是否自增列	是否主键列
[redacted]	dbo	[redacted]	消息群发用户对应关系表	2015-11-19	1	MessageGroupId		int		0	1	1
[redacted]	dbo	[redacted]	消息群发用户对应关系表	2015-11-19	2	MessageTextId	消息文本ID	int	{0}	0	0	0
[redacted]	dbo	MessageGroups	消息群发用户对应关系表	2015-11-19	3	UserIdts	用户ID列表 用逗号分隔	text	()	0	0	0

## MySQL Data Dictionary

LinuxIP: [redacted] 数据库IP: [redacted]

记录条数: 10 占用空间: 1B

表类型	数据库名称	表名称	表描述	创建时间	字段序号	字段名称	字段描述	数据类型	默认值	是否允许为空	是否自增列	是否主键列
def	[redacted]	[redacted]	账户属性	2016-09-26	1	AA_ACCTD_N	账户编号	bigint(20)		0	0	1
def	[redacted]	[redacted]	账户属性	2016-09-26	2	AA_USER_ID	用户ID	bigint(20)		1	0	0
def	[redacted]	[redacted]	账户属性	2016-09-26	3	AA_ALIAS_NAME_V	账户名	varchar(64)		1	0	0
def	[redacted]	[redacted]	账户属性	2016-09-26	4	AA_STATUS_N	账户状态 (0:最新正常, 1:冻结, 2:注销)	char(2)		1	0	0
def	[redacted]	[redacted]	账户属性	2016-09-26	5	AA_VERSION_N	版本号	bigint(10)	0	1	0	0
def	[redacted]	[redacted]	账户属性	2016-09-26	6	AA_ACCOUNTING_TYP_E_C	会计科目类型0: 负债, 1: 资产, 2: 所有者权益	char(1)	0	0	0	0
def	[redacted]	[redacted]	账户属性	2016-09-26	7	AA_POSITIVE_C	0:不允许为负, 1:允许为负	char(1)	0	1	0	0
def	[redacted]	[redacted]	账户属性	2016-09-26	8	inserttime		times tamp	CURRENT_TIMESTAMP	0	0	0
def	[redacted]	[redacted]	账户属性	2016-09-26	9	updatestime		times tamp	CURRENT_TIMESTAMP	0	0	0
def	[redacted]	[redacted]	账户属性	2016-09-26	10	isactive		tinyint(4)	1	0	0	0

# Meta Data-DB/OS Meta Data



## Windows MetaData

Domain Name: WORKGROUP Windows IP: 172.17.1.1

Server Manufacturer: HP Server Model: ProLiant DL360 Gen9

ServerSystemName: Windows Server 2008 R2 Enterprise Server Hyper Thread: Enabled

### Windows ServerInfoReport

DomainName: WORKGROUP

HostIP: 172.17.1.1

HostName: DES15DL360 Manufacturer: HP Model: ProLiant DL360 Gen9 CDDriver: SystemType: x64 based PC.

SystemName: Windows Server 2008 R2 Enterprise HyperThread: Enabled [Disk Size Info](#)

Memor: 128GB

CpuInfo: (Intel(R) Xeon(R) CPU E5-2630 v3 @ 2.40GHz)Caption: Intel(R) Family 6 Model 43 Stepping 21,2CacheSize:1,3CacheSize:4096

LogicalProcessor:32

Processor:2

NetWorkInfo:

IP	SubNetMask	DNSServer	Gateway	MacAddress	Is DHCP	IPEnabled	Description
172.17.1.1	255.255.255.0			3CAB:2A:12:EB:4C	False	True	HP Ethernet 1Gb 4-port 331i Adapter
172.17.1.1	255.255.255.0	172.17.8.201	172.17.10.1	3CAB:2A:12:EB:4D	False	True	HP 网络适配器 #1

DiskInfo:

HostName	Device	File System	Size	Device ID	diskmodel	PRIPDevice ID	Interface Type	Partition Size	Partition ID	Firmware Revision	Disk Manufacturer
DES15DL360	C:	NTFS	111000	(L, PHYSICALDRIVE)	HP LOGICAL VOLUME SCSI Disk Device	SCSI\DISKVEN_HPMROD_JLOGICAL_VOLUME\04	SCSI	111000	Disk #0, Partition #2	2.52	(H) (H) (H) (H) (H)
DES15DL360	D:	NTFS	150000	(L, PHYSICALDRIVE)	HP LOGICAL VOLUME SCSI Disk Device	SCSI\DISKVEN_HPMROD_JLOGICAL_VOLUME\04	SCSI	157000	Disk #1, Partition #0	2.52	(H) (H) (H) (H) (H)
DES15DL360	E:	NTFS	800000	(L, PHYSICALDRIVE)	HP LOGICAL VOLUME SCSI Disk Device	SCSI\DISKVEN_HPMROD_JLOGICAL_VOLUME\04	SCSI	157000	Disk #1, Partition #1	2.52	(H) (H) (H) (H) (H)
DES15DL360	F:	NTFS	720000	(L, PHYSICALDRIVE)	HP LOGICAL VOLUME SCSI Disk Device	SCSI\DISKVEN_HPMROD_JLOGICAL_VOLUME\04	SCSI	157000	Disk #1, Partition #2	2.52	(H) (H) (H) (H) (H)



# Meta Data-DB/OS Meta Data



## Linux MetaData

**LinuxServerInfoReport**

LinuxIP: 172.17.1.1      Port: 22      HostName: DB01\_linux\_00101300

Kernel: Linux DB01\_linux\_00101300 2.6.32-07.el6.x86\_64

Release: CentOS release 6.7 (Final)      SysBit: 64

Physical\_Cpus: 2      Logical\_Cpus: 40      Physical\_MemoryGB: 125.91

**CrontabInfo**

```

0 * * * * /usr/bin/rxdate http://openpdacorp.com > /dev/null 2>&1
* * * * * /home/perfmonscript/perfmon.sh
0 0 * * * /opt/scripts/dbmon_client/dbmon_client slowlog
0 2 * * * /data/archdata_backup/purgedata.sh

0 1 * * 2-6 /data/archdata_backup/archdata.sh
    
```

**CPUInfo:**

CPU Type	Physical CPUs	Logical CPUs

**MemoryInfo:**

Mem Total(GB)	Mem Free(GB)	Buffers(GB)	Swap Total(GB)	Swap Free(GB)
125.91	17.14	0.42	64.00	64.00

**NetworkInfo:**

EthName	IPAddress	HWAddr	Mask	Net	Bcast	SpeedMode	Product
bond0	172.17.1.1	92:BB:01:96:07:99	255.255.255.0	172.17.1.0/24	255.255.255.0	RxTx	bond0: link status defaults to up for interface eth0: 1000 Mbps Full duplex
bond0:1	172.17.1.1	92:BB:01:96:07:99	255.255.0.0	172.17.0.0/16	255.255.0.0	RxTx	
eth0	172.17.1.1	92:BB:01:96:07:99	255.255.255.0	172.17.1.0/24	255.255.255.0	RxTx	eth0: igb NCLink is Up 1000 Mbps Full Duplex, Flow Control: RX

**Disk Info:**

File System	Size(GB)	Used(GB)	Free(GB)	UsedPercent (%)	MountCn	File Type
/dev/sda4	4.00	0.02	4.03	1	/home	
/dev/sda1	0.20	0.00	0.20	1	/boot/efi	
/dev/sda5	756.44	7.10	735.92	1	/	
/dev/sda2	0.47	0.04	0.39	13	/boot	
tmpfs	62.96	0.00	62.96	0	/dev/shm	Swap
/dev/sdb1	1,320.13	448.57	804.49	36	/data	

# Meta Data-DB/OS Meta Data



## MssqlServer MetaData

**SQLServerInfo**

DomainName: WDBKGROUP

SQL: 172.17.1.100

DNSServerName: WDBKGROUP

WindowsServerName: WDBKGROUP

InstanceName: MSSQLSERVER

SQLServerEdition: Enterprise Edition (64-bit)

Product Level: SP2

Product Version: 10.50.4000

Build Date: 2008.08.01

Physical CPU Count: 4

Logical CPU Count: 16

Physical Memory (MB): 2048

SQLMax Memory (MB): 2048

SQLMin Memory (MB): 2048

SQLCacheMemory (KB): 268435456

Max Workers: 254

User Scheduler: 0

Part	Server Collation	Language	SQLInstance	SQLStart Ascent	Max Connections	RemoteQueryTimeOut	RemoteLogInTimeOut	EnableOdbcSql	EnableDWE	EnableCLR	EnableRAC	EnableRPL	MDP
2433	Chinese_PRC_CI_AS	简体中文	MSSQLSERVER	CEBA_Monitor	0	300	30	Yes	No	No	No	No	40

MSDBInfo

DBName	DBId	DBDesc	db Owner	Collation	Level	rtbs desc	CollState	SubState	PubDate	DistDate	MirrorDate	Logging Status
msdb	4	MS SQLSERVER	sa	Chinese_PRC_CI_AS	100	ONLINE	Disabled	Disabled	Disabled	Disabled	Disabled	Disabled

**SQLServerMirrorInfo**

MasterDomain: WDBKGROUP

MasterName: 172.17.1.100

MasterIP: 172.17.1.100

PartnerDomain: WDBKGROUP

PartnerName: 172.17.1.100

PartnerIP: 172.17.1.100

MirrorInfo

MasterServer	MasterDBName	MirrorDate	FullOverCount	MirrorStatus	PartnerName	PartnerDate	CanTimeSave	MaxRedoQueue	MirrorDate
172.17.1.100	msdb	2008/12/29 00:00	1	正在同步	172.17.1.100	2008/12/29 00:00	无节省	10	2008/12/29 00:00

MirrorRepInfo

Master Svr	Master Mirr Svr Name	Master Mirr Svr Owner	Master Conn Account	Master Conn User	Master Conn Date	Partner Svr	Partner Mirr Svr Name	Partner Mirr Svr Owner	Partner Conn Account	Partner Conn User	Partner Conn Date	Partner Conn Status
172.17.1.100	Enterprise Mirroring	CEBA_dingxin	sa	login account	2008/12/29 00:00	172.17.1.100	Enterprise Mirroring	CEBA_dingxin	sa	login account	2008/12/29 00:00	正在同步

Rep Info

**SQLServerRepInfo**

PubName: 172.17.1.100

SubName: 172.17.1.100

PubOwner: sa

SubOwner: sa

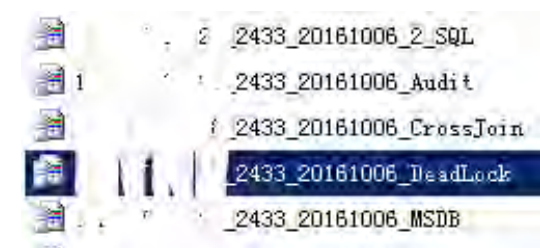
RepInfo

Publication	DistRepAgent	Publisher Login	Subscriber Login	Replication Agent	Publication	SubStatus	SubType	SyncType
sp_ppkai_fund_080100_140_ppkai_Depot_A_Rep_01	DB020100_ppkai_fund_080100_1712171010140	DBUser	dbuser	DB020100_ppkai_fund_01	140	正在同步	push	automatic

RepMirrorInfo

Publication	Article
sp_ppkai_fund_080100_140_ppkai_Depot_A_Rep_01	UserTransferInfo

- 172.17.1.100\_2433\_DatabaseMirroringEndPoints\_20161011
- 172.17.1.100\_2433\_jobs\_20161011
- 172.17.1.100\_2433\_jobs\_ExceptDBA\_20161011
- 172.17.1.100\_2433\_jobs\_False\_20161011
- 172.17.1.100\_2433\_jobs\_True\_20161011
- 172.17.1.100\_2433\_LinkServers\_20161011
- 172.17.1.100\_2433\_ServerDataBaseTriggers\_20161011
- 172.17.1.100\_2433\_SQLAlias\_20161011
- 172.17.1.100\_2433\_SQLLogin\_20161011



# Meta Data-DB/OS Meta Data



## Mysql MetaData

**MySQLtoInfo**

Configure Info

ServerName: 172.17.17.11 Port: 3306

Host Name: DB01\_Inst\_005D1308 Version: 5.7.14-log

MySQL version: 5.7.14 Protocol version: 10

Storage engine: InnoDB License: GPL

Log output: SQL System time zone: CST

Not show: STRICT\_TRANS\_TABLES NO\_ENGINE\_SUBSTITUTION

autoincrement	auto_increment_increment	auto_increment_offset	character set server	character set client	character set results	charset	collate	hostname	hostname	innodb data home dir	innodb log group home dir	locking format	innodb file format	innodb flush mode
ON	1	1	utf8	utf8	utf8	utf8mb4	utf8mb4_320_ci	172.17.17.11	172.17.17.11	/data/mysql_3403/	/data/mysql_3403/log	ROW	Barcade	STRICT

User Info

**MySQLuserinfo**

ServerName: 172.17.17.11 Port: 3306

User Info	Grant For
root@localhost	GRANT ALL PRIVILEGES ON * TO root@localhost WITH GRANT OPTION GRANT PRIVILEGE ON * TO root@localhost WITH GRANT OPTION
mysql@localhost	GRANT USAGE ON * TO mysql@localhost GRANT TRIGGER ON * TO mysql@localhost GRANT SELECT ON * TO mysql@localhost GRANT PROCESS, REPLICATION SLAVE, REPLICATION CLIENT ON * TO mysql@localhost GRANT SELECT ON * TO mysql@localhost
mysql@localhost	GRANT RELOAD ON * TO mysql@localhost
mysql@localhost	GRANT SELECT, RELOAD, FILE, SUPER, REPLICATION SLAVE, REPLICATION CLIENT ON * TO mysql@localhost
mysql@localhost	GRANT USAGE ON * TO mysql@localhost GRANT SELECT, INSERT, UPDATE, EXECUTE ON * TO mysql@localhost
mysql@localhost	GRANT ALL PRIVILEGES ON * TO mysql@localhost WITH GRANT OPTION
mysql@localhost	GRANT ALL PRIVILEGES ON * TO mysql@localhost WITH GRANT OPTION
mysql@localhost	GRANT ALL PRIVILEGES ON * TO mysql@localhost

DB Info

**MySQLDBInfo**

ServerName: 172.17.17.11 Port: 3306

database name	default character set	default collation	charset	collate
information_schema	utf8	utf8_general_ci	utf8	utf8_general_ci
mysql	utf8	utf8_general_ci	utf8	utf8_general_ci

## MySQLConfigure Info

Parameter	Value
server_id	172.17.17.11:3306
autocommit	ON
auto_increment_increment	1
auto_increment_offset	1
back_log	1000
basedir	/opt/mysql
binlog_cache_size	4194304
binlog_format	ROW
bulk_insert_buffer_size	8388608
character_set_client	utf8
character_set_results	utf8
character_set_server	utf8
connect_timeout	60
datadir	/data/mysql_3403/var/
default_storage_engine	InnoDB
event_scheduler	OFF
expire_logs_days	10
general_log	OFF
general_log_file	/data/mysql_3403/var/DB01_inst_005D1308_log
have_query_cache	YES
hostname	DB01_inst_005D1308
innodb_adaptive_flushing	ON
innodb_adaptive_flush_index	ON
innodb_additional_mem_pool_size	1048576
innodb_autoextend_increment	64
innodb_buffer_pool_instances	8
innodb_buffer_pool_size	75161927680
innodb_change_buffering	all
innodb_checksums	ON
innodb_commit_concurrency	0
innodb_concurrency_tickets	5000
innodb_data_file_path	ibdata1:1000M:autoextend
innodb_data_home_dir	/data/mysql_3403/iblog
innodb_doublewrite	ON
innodb_flush_log_at_shutdown	1
innodb_flush_log_at_timeout	Barcade
innodb_flush_table	ON
innodb_flush_log_at_trx_commit	1
innodb_flush_method	O_DIRECT
innodb_force_recovery	0
innodb_io_capacity	200
innodb_lock_unsafe_for_binlog	OFF
innodb_lock_wait_timeout	120

# DB Features Configure



- **Mssql**
  - **Logshipping**
  - **Mirror**
  - **AlwaysOn**
  - **Cluster**
  - **SSB**
  - **CDC**
- **Mysql**
  - **MHA**

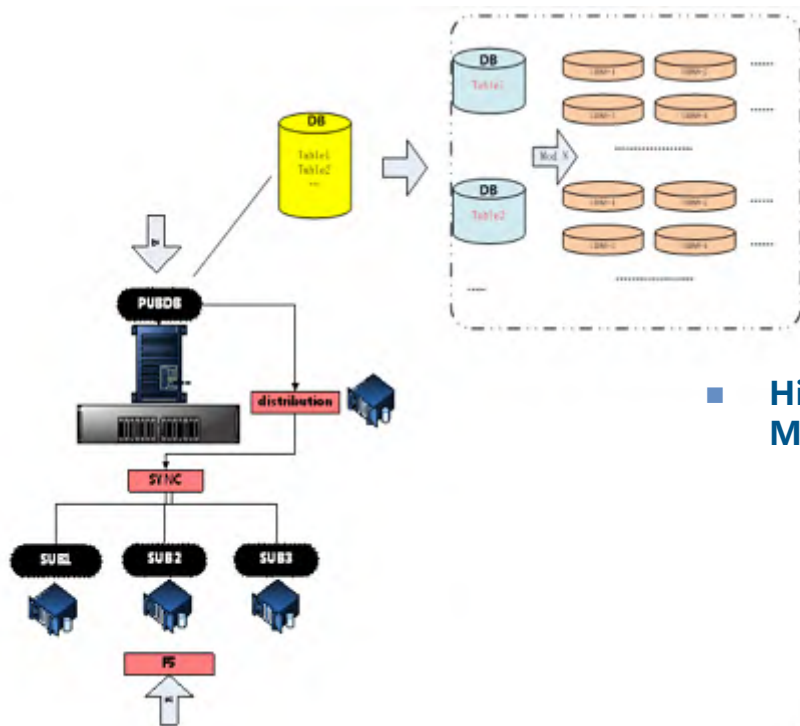


# DB Features Configure



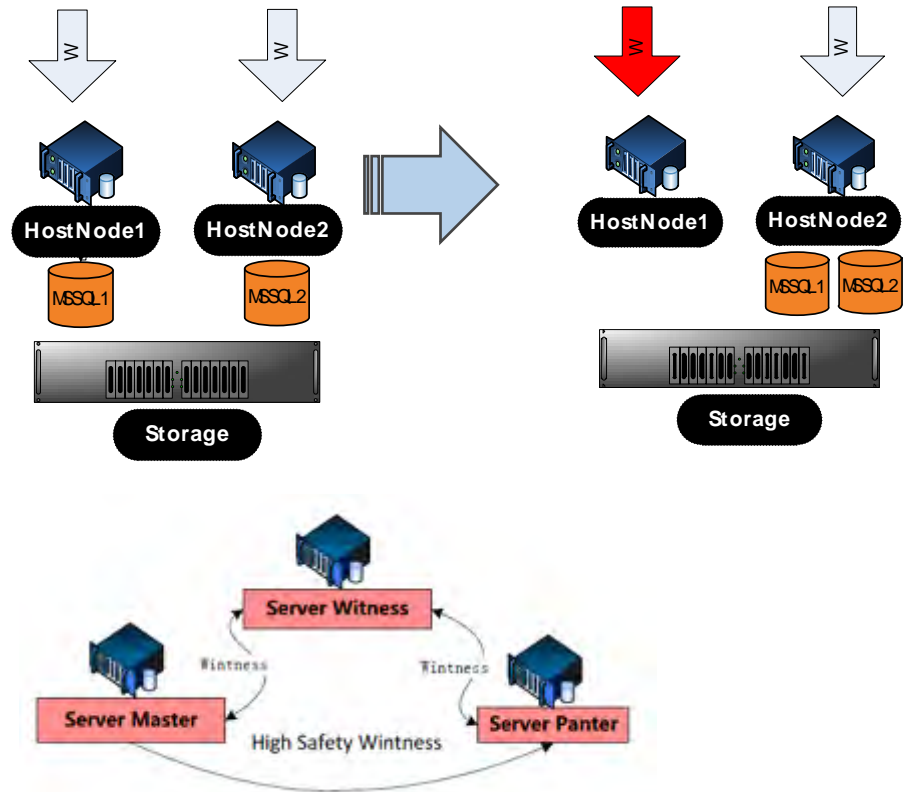
## Mssql

- Load balance



- High Safety Mirror

- Cluster/Always on cluster

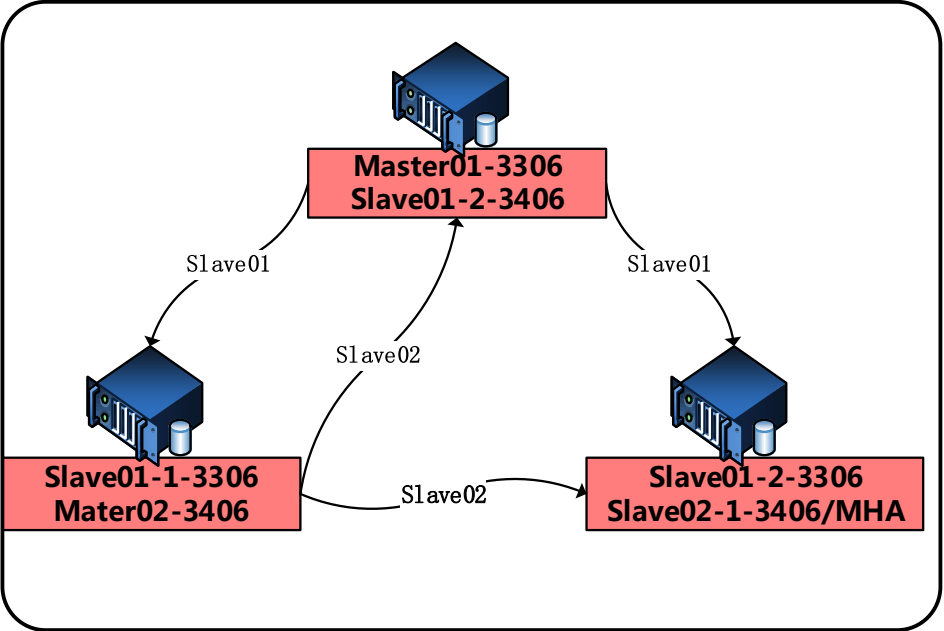


# DB Features Configure



*mysql*

MHA/Slave



# 自动化可视化



## DB ServerInfoReport

[NetInfoURL Info](#) | [Data Dictionary](#) | [Test Servers Info](#) | [DB Server Info](#) | [E.O. DBPs Performance](#) | [Greenplum DB Performance](#) | [Oracle DB Performance Info](#) | [Hive ETL Status](#) | [MySQl Table Monitor](#) | [HiveQL Table Monitor](#)  
 DB Server Count: [Windows DB Count](#) | [MySQl DB Count](#)  
 MySQl Table Info: [DB Backup Info](#)

MySQl Info

DomainInfo	Id Domain	Windows IP	Id Vm	SqlServerIP	Cluster Name	WinServerInfo	DiskCustInfo	SqlServerInfo	DBInfo	SqlBackupInfo	ServerAnalysis	WinPerfor	WinDiskPerfor	WinNetPerfor	SqlPerfor	SqlError Log	WinError Log	DeadLock Info	Slow SQL	DB Audit	Analysis Top10	Disk Queue	Purchase Price	Online Years	Machine Use Type	Rate Of Depreciation
						WinServerInfo	DiskCustInfo	MS SQL Server Info	DBInfo	MS Backup Info	SQL Server Analysis	WinPerfor	WinDiskPerfor	WinNetPerfor	SqlPerfor	SqlError Log	WinError Log	DeadLock Info	Slow SQL	DB Audit	Analysis Top10	Disk Queue	2000	0.924	48h	100%
						WinServerInfo	DiskCustInfo	MS SQL Server Info	DBInfo	MS Backup Info	SQL Server Analysis	WinPerfor	WinDiskPerfor	WinNetPerfor	SqlPerfor	SqlError Log	WinError Log	DeadLock Info	Slow SQL	DB Audit	Analysis Top10	Disk Queue	2004	0.92	48h	0%
						WinServerInfo	DiskCustInfo	MS SQL Server Info	DBInfo	MS Backup Info	SQL Server Analysis	WinPerfor	WinDiskPerfor	WinNetPerfor	SqlPerfor	SqlError Log	WinError Log	DeadLock Info	Slow SQL	DB Audit	Analysis Top10	Disk Queue	2700	0.914	48h	100%
						WinServerInfo	DiskCustInfo	MS SQL Server Info	DBInfo	MS Backup Info	SQL Server Analysis	WinPerfor	WinDiskPerfor	WinNetPerfor	SqlPerfor	SqlError Log	WinError Log	DeadLock Info	Slow SQL	DB Audit	Analysis Top10	Disk Queue	1800	0.914	48h	100%
						WinServerInfo	DiskCustInfo	MS SQL Server Info	DBInfo	MS Backup Info	SQL Server Analysis	WinPerfor	WinDiskPerfor	WinNetPerfor	SqlPerfor	SqlError Log	WinError Log	DeadLock Info	Slow SQL	DB Audit	Analysis Top10	Disk Queue	2004	0.914	48h	0%
						WinServerInfo	DiskCustInfo	MS SQL Server Info	DBInfo	MS Backup Info	SQL Server Analysis	WinPerfor	WinDiskPerfor	WinNetPerfor	SqlPerfor	SqlError Log	WinError Log	DeadLock Info	Slow SQL	DB Audit	Analysis Top10	Disk Queue	2004	0.92	48h	0%

MySQl

LinuxIP	MySQlIP	DBMS	LinuxServerInfo	MySQlInfo	MySQlConfigure	MySQlConfigureMysql	MySQlDBInfo	MySQlTableInfo	LinuxPerformance	LinuxDiskPerformance	MySQlDBPerformance	MySQlStatus	MySQlDeadLockInfo	MySQlUsefulIndexInfo	MySQlErrorLog	LinuxErrorLog	mysqlBackupLog
		5M	LinuxServerInfo	MySQlInfo	MySQlConfigure	MySQlConfigureMysql	MySQlDBInfo	MySQlTableInfo	LinuxPerformance	LinuxDiskPerformance	MySQlDBPerformance	MySQlStatus	MySQlDeadLockInfo	MySQlUsefulIndexInfo	MySQlErrorLog	LinuxErrorLog	mysqlBackupLog
			LinuxServerInfo	MySQlInfo	MySQlConfigure	MySQlConfigureMysql	MySQlDBInfo	MySQlTableInfo	LinuxPerformance	LinuxDiskPerformance	MySQlDBPerformance	MySQlStatus	MySQlDeadLockInfo	MySQlUsefulIndexInfo	MySQlErrorLog	LinuxErrorLog	mysqlBackupLog
			LinuxServerInfo	MySQlInfo	MySQlConfigure	MySQlConfigureMysql	MySQlDBInfo	MySQlTableInfo	LinuxPerformance	LinuxDiskPerformance	MySQlDBPerformance	MySQlStatus	MySQlDeadLockInfo	MySQlUsefulIndexInfo	MySQlErrorLog	LinuxErrorLog	mysqlBackupLog
			LinuxServerInfo	MySQlInfo	MySQlConfigure	MySQlConfigureMysql	MySQlDBInfo	MySQlTableInfo	LinuxPerformance	LinuxDiskPerformance	MySQlDBPerformance	MySQlStatus	MySQlDeadLockInfo	MySQlUsefulIndexInfo	MySQlErrorLog	LinuxErrorLog	mysqlBackupLog
			LinuxServerInfo	MySQlInfo	MySQlConfigure	MySQlConfigureMysql	MySQlDBInfo	MySQlTableInfo	LinuxPerformance	LinuxDiskPerformance	MySQlDBPerformance	MySQlStatus	MySQlDeadLockInfo	MySQlUsefulIndexInfo	MySQlErrorLog	LinuxErrorLog	mysqlBackupLog
			LinuxServerInfo	MySQlInfo	MySQlConfigure	MySQlConfigureMysql	MySQlDBInfo	MySQlTableInfo	LinuxPerformance	LinuxDiskPerformance	MySQlDBPerformance	MySQlStatus	MySQlDeadLockInfo	MySQlUsefulIndexInfo	MySQlErrorLog	LinuxErrorLog	mysqlBackupLog

MySQl Info

MySQlIP	MySQlDBPerformance	MySQlStatusInfo	MySQlPerformance	MySQlDeadPerformance
	MySQlDBPerformance	MySQlStatusInfo	MySQlPerformance	MySQlDeadPerformance

Business Line Info

Business Line	DBOs Size	DBPerfor	DBMsg Perfor
	DBOs Size	DBPerfor	DBMsg Perfor
	DBOs Size	DBPerfor	DBMsg Perfor
	DBOs Size	DBPerfor	DBMsg Perfor
	DBOs Size	DBPerfor	DBMsg Perfor
	DBOs Size	DBPerfor	DBMsg Perfor
	DBOs Size	DBPerfor	DBMsg Perfor

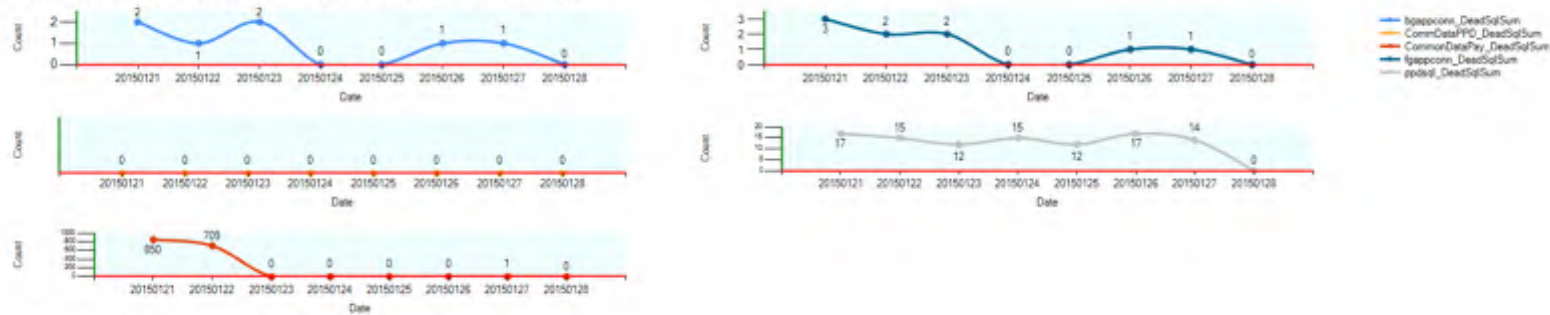
ETL LOG Info

MySQlIP	ETL Log
	E3A0
	E3A0

# 自动化可视化



DeadLockKPI\_DeadSqlSum\_192.168.100.200\_1433



This is a DeadLockKpi mail,Please Check it out!

Repl info:

## SQLServerReplInfo

PubWinip:192.168.100.200

DistWinip:192.168.100.203

SubWinip:192.168.100.203

PubSqlip:192.168.100.200\_1433

DistSqlip:192.168.100.203\_2433

SubSqlip:192.168.100.203\_2433

PubDB:PPD

DistDB:DistDB\_TransData

SubDB:Ppd\_repl

ReplInfo:

Publication	DistReplAgent	PublisherLogin	SubscriberLogin	ReadLogAgent	PubStatus	SubStatus	SubType	SyncType
RP_PPD_DB001R720.PPD_Repl_01	DB003R920-PPD-Rp_Ppd_DB001R720.Ppd_-DB001R720-1	DBSys_Repl	DBSys_Repl	DB003R920-PPD-2	trans	活动	push	replication support only

ReplArticles:

Publication	Article
RP_PPD_DB001R720.PPD_Repl_01	UserCompanyOwners
RP_PPD_DB001R720.PPD_Repl_01	UserDetails
RP_PPD_DB001R720.PPD_Repl_01	UserWageEarnings



# 自动化可视化



## MSSQLRepliationAgent\_commands\_Alert(DateTime:2014-12-12 11:54:08)

### ReplAgentMonitor Missing :

Missing 'Agent history clean up%' job

### ReplAgentMonitor Missing :

Missing 'Distribution clean up%' job

### -- ReplAgentMonitor SQL:

```
select x1.name,x1.enabled,x2.name from msdb.dbo.sysjobs as x1 with(nolock)
inner join sys.syslogins as x2 with(nolock)
on (x1.name like 'Agent history clean up%' or x1.name like 'Distribution clean up%')
and x2.sid=x1.owner_sid option(maxdop 1)
```

### DeadLock Info

Server: 192.168.100.200 1433

Database: DBName=ppdai\_fund;DBid=35

StartTime: 01 21 2015 2:06AM

### DeadSQL:

WebHostName:"PPD-WEB-63" ApplicationName:".Net SqlClient Data Provider" LoginName:"CommonDataPay"

Proc [Database Id = 35 Object Id = 1669580766]

### Relation SQL:

WebHostName:"PPD-WEB-105" ApplicationName:".Net SqlClient Data Provider" LoginName:"fgappconn"

```
{@PayOff int output,@ListingId int} DECLARE @RepayAmount MONEY DECLARE @OwingAmount MONEY DECLARE @OwingOverdue MONEY DECLARE @OwingPrincipal MONEY DECLARE @OwingInterest MONEY DECLARE @OwingDun MONEY DECLARE @La
@NextRepayDate DATETIME DECLARE @OrderId INT DECLARE @Number INT SELECT
@Number=COUNT(1),@RepayAmount=SUM(RepayAmount),@OwingAmount=SUM(OwingAmount),@OwingOverdue=SUM(OwingOverdue),@OwingPrincipal=SUM(OwingPrincipal),@OwingInterest=SUM(OwingInterest),@OwingDun=SUM(OwingDun),@La
FROM dbo.ListLoan with(nolock) WHERE listingid=@ListingId SELECT TOP 1 @NextRepayDate=DueDate,@OrderId=OrderId-1 FROM dbo.ListLoan with(nolock) WHERE listingid=@ListingId AND StatusID IN (0,4,5) ORDER BY OrderId ASC IF(@OrderId IS NULL)
UPDATE dbo.ListLoanTotal SET Number=@Number,CurrentNumber=@OrderId,RepayAmount=@RepayAmount,OwingAmount=@OwingAmount,OwingOverdue=@OwingOverdue,OwingPrincipal=@OwingPrincipal,OwingInterest=@OwingInterest
```

WebHostName:"PPD-WEB-63" ApplicationName:".Net SqlClient Data Provider" LoginName:"CommonDataPay"

Proc [Database Id = 35 Object Id = 1669580986]

# 自动化可视化



**Fingerprint** Example Normalized Advisor Review

密码正确通过率 select ? province\_name ,sum(loginsuccess) success,sum(login) total, concat(sum(loginsuccess)/sum(login)\* ?, ?) from ( select r.idnumber, max(case when d.status\_code = ? then ? else ? end) loginsuccess, ? login from ppx\_jd\_request\_log r,ppx\_jd\_detail\_log d where ? = ? and d.inserttime > ? and r.serial\_number = d.serial\_number and d.event\_code= ? and d.status\_code!= ? and d.status\_code!= ? group by r.idnumber ) t union all ( select ? province\_name ,sum(loginsuccess) success,sum(login) total, concat(sum(loginsuccess)/sum(login)\* ?, ?) from ( select r.idnumber, max(case when d.status\_code = ? then ? else ? end) loginsuccess, ? login from ppx\_jd\_request\_log r,ppx\_jd\_detail\_log d where ? = ? and d.inserttime > ? and r.serial\_number = d.serial\_number and r.jd\_username not regexp ? and d.event\_code= ? and d.status\_code!= ? and d.status\_code!= ? group by r.idnumber ) t ) union all ( select province\_name province\_name,sum(loginsuccess) success,sum(login) total, concat(sum(loginsuccess)/sum(login)\* ?, ?) from ( select r.idnumber, p.province\_name,max(case when d.status\_code = ? then ? else ? end) loginsuccess, ? login from ppx\_jd\_request\_log r,ppx\_jd\_detail\_log d,ppdai\_mj\_dp\_meta\_mobilephone\_location m,ppdai\_mj\_dp\_meta\_city c,ppdai\_mj\_dp\_meta\_province p where ? = ? and d.inserttime > ? and r.jd\_username regexp ? and r.serial\_number = d.serial\_number and d.event\_code= ? and d.status\_code!= ? and d.status\_code!= ? and m.pre ? nums=left(r.jd\_username, ?) and m.city\_id=c.id and c.province\_id=p.id group by r.idnumber ) t group by t.province\_name order by sum(loginsuccess)/sum(login) desc,total desc ) #select \* from ppdai\_mj\_dp\_meta\_mobilephone\_location where pre ? nums= ? limit ?

• Explain

- Detailed Stats

Seen between 2016-10-09 16:18:35 and 2016-10-19 10:01:53.

3 queries per day.

Time of day  
Weekday  
Day of the month  
Months

Boolean Attributes	Count	%
Query Count	31	-
Query Cache		
Full Scan		
Full Join		
Temporary Tables		
On Disk Temporary Tables		
File Sorts		
On Disk File Sorts		

Attribute	Median	95%	StdDev	Min	Max	Sum
Query Time (ms)	2,565	3,034	445	1,586	3,901	81,372
Lock Time (ms)	1	1	0	1	1	29
Rows Sent	33	33	0	32	33	1,022
Rows Examined	1,083,080	1,159,762	100,088	789,032	1,389,860	34,104,230
Rows Affected						

# 性能成本



SQL BUSINESS LINE:

Business Line ID	businessline
7	线上主服务器

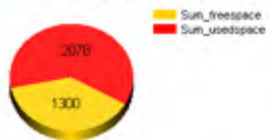
HOST INFO: 共2台, 总价: ¥373000

Host IP	SQLIP	dctype	Note	Purchased Price	Online Years	Machine Use Type	Rate Of Depreciation	DNS Server	Server Model	HDD Type	Physical Memory	Cpu Cores
172.17.0.72	172.14.33	Primary	线上主服务器	186500	0.27年	AB类	100%	ppdai01-10-30.db.ppdai.com; ppdai01-100-200.db.ppdai.com; ppdai01-mssql-10-72.db.ppdai.com	DL580	800g ssd*10	256GB	12
172.17.0.73	172.14.33	Mirror	主服务器镜像	186500	0.25年	AB类	100%	ppdai01-mssql-10-73.db.ppdai.com	DL580	800g ssd*10	256GB	12

- 服务器硬件成本、折旧率
- 数据存储生命周期
- 业务性能指标TPS、QPS、Iops

Space Used:

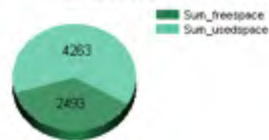
主库空间使用情况 (GB)



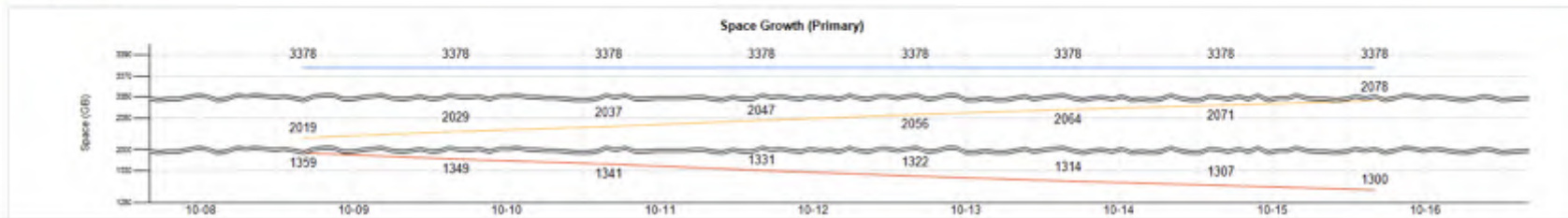
备库空间使用情况 (GB)



主+备空间使用情况 (GB)



Space growth: 主库



# 性能成本



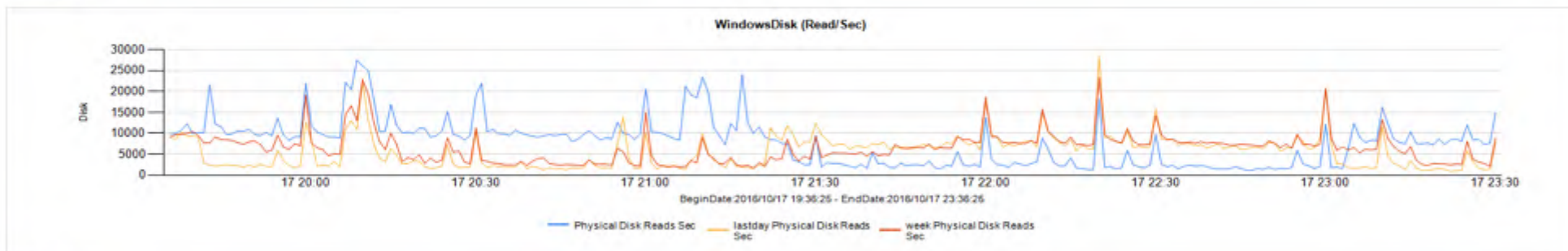
BusinessLine SumPerfor (性能指标求和)

BusinessLineName: 共2台

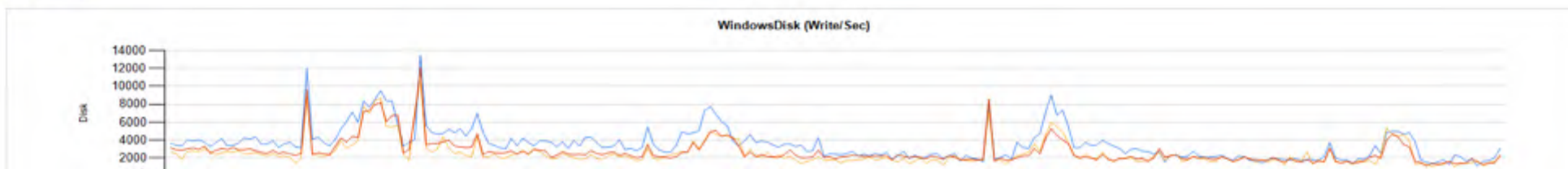
Sql IP	Business Line	dbtype
192.168.1.1433	线上主服务器	Primary
192.168.1.1433	主服务器镜像	Mirror

Disk: Iops-Read/Sec+Write/Sec

DiskRead/Sec



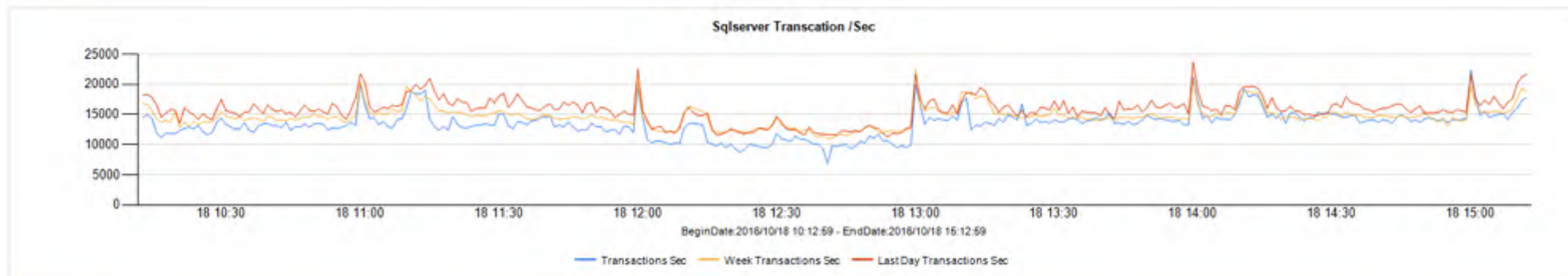
Disk: Write/Sec



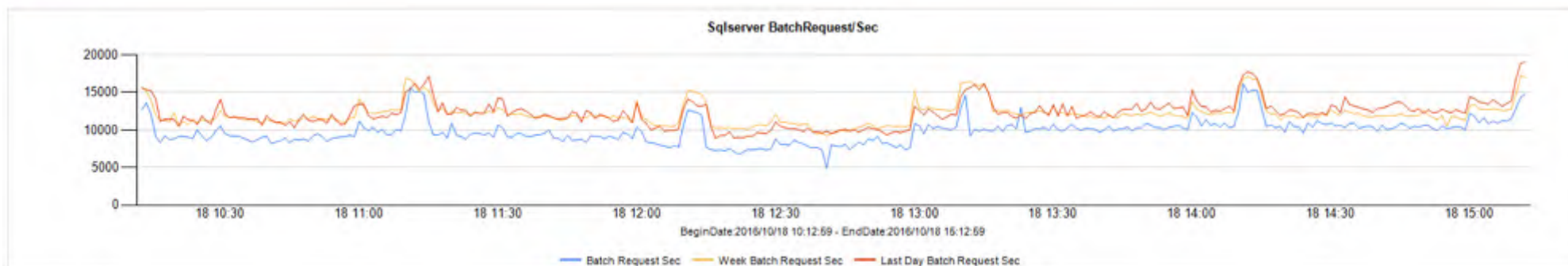
# 性能成本



Transactions/Sec



BatchRequest/Sec



# 性能成本



- 部分非核心业务切换mysql
- Mysql 社区版 ( 5.7.14 )
  - 支持并行复制
  - 支持高版本percona audit
  - 较完善的管理工具





# Thank You

**2016年11月2日星期三**