# 现象

系统页面卡住，用户无法操作。

# 第1次调优

## 分析

Jvm内存快使用完。

## 解决办法

设置JVM的初始和最大内存都为6G.

# 第2次调优

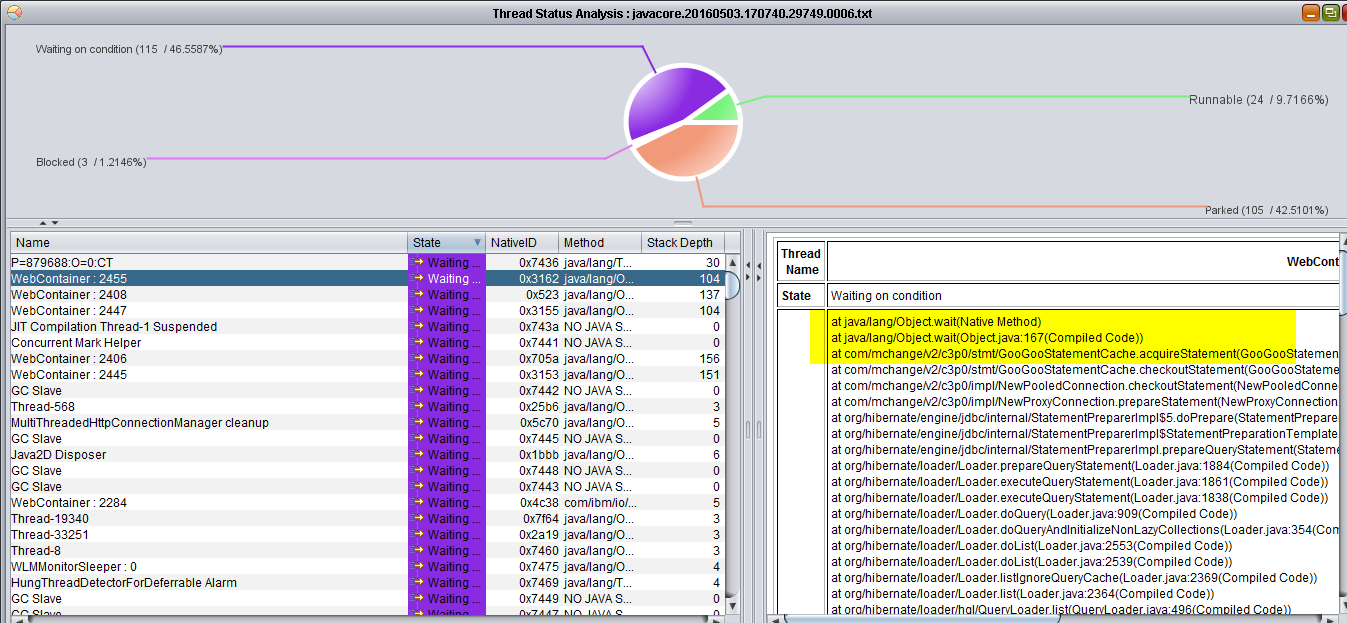
## 分析

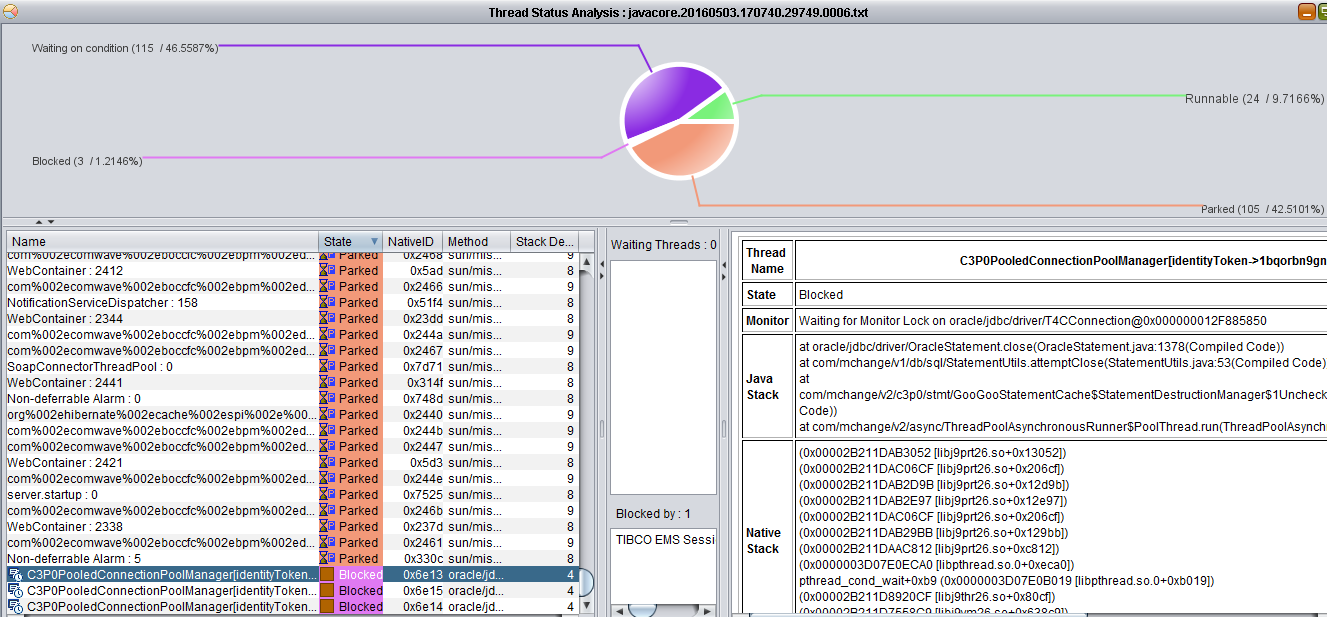
之前分析内存占用很大，主要是有部分代码缓存了很多对象，已修改部署；

但卡住的现象还是未解决，进一步分析 java core 的情况：

1. 系统线程包含很多Waiting on condition的线程，这些进程很多是等待C3P0数据源获取statement；
2. 系统线程包含3个blocked的线程，也是c3p0数据源在处理statament的时候卡住；

故可以判断是c3p0数据源配置需要优化。





## 解决办法

从生产配置看max\_statements配置过小只配置了100，建议调整为2000。

|  |
| --- |
| <property name=*"hibernate.c3p0.min\_size"* value=*"50"* />  <property name=*"hibernate.c3p0.max\_size"* value=*"500"* />  <property name=*"hibernate.c3p0.acquire\_increment"* value=*"5"* />  <property name=*"hibernate.c3p0.idle\_test\_period"* value=*"300"* />  **<property name=*"hibernate.c3p0.max\_statements"* value=*"100"* />**  <property name=*"hibernate.c3p0.timeout"* value=*"120"* /> |

# 第3次调优

## 分析

较多处理request对象的请求处于 waiting on condition状态，应是was处理能力不足。

## 解决办法

调整WAS的线程池配置，加到线程池大小，从原来的200改为500； 最小设置为20；



# 第4次调优

日期： 2016-05-16

## 分析

* + 1. 数据源

Log中有较多以下错误，原因是c3p0数据源使用已经被关闭的connection连接：

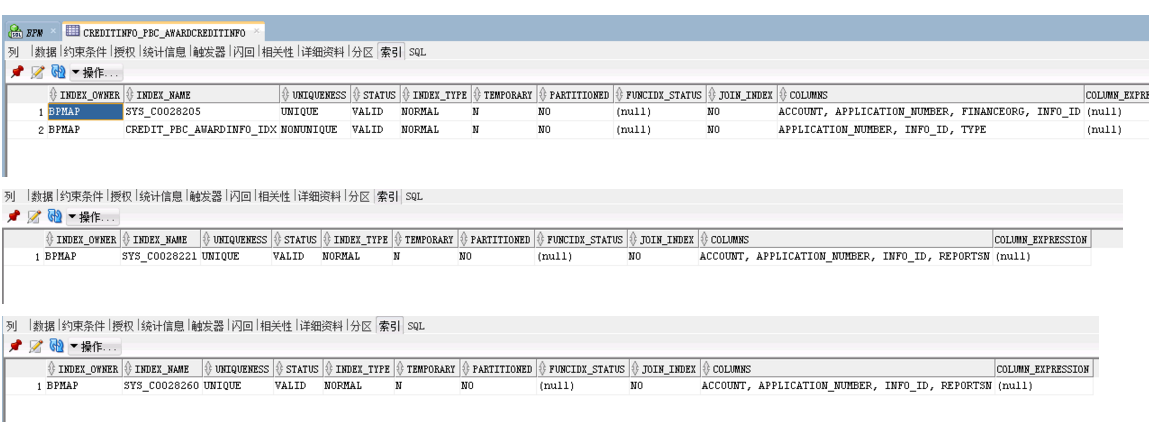
|  |
| --- |
| [5/16/16 12:48:32:521 CST] 0000005d DynamicPooled W com.mchange.v2.c3p0.management.DynamicPooledDataSourceManagerMBean getAttribute Failed to get requested attribute: numBusyConnections  java.lang.reflect.InvocationTargetException  at sun.reflect.GeneratedMethodAccessor256.invoke(Unknown Source)  at sun.reflect.DelegatingMethodAccessorImpl.invoke(DelegatingMethodAccessorImpl.java:37)  at java.lang.reflect.Method.invoke(Method.java:611)  at com.mchange.v2.c3p0.management.DynamicPooledDataSourceManagerMBean.getAttribute(DynamicPooledDataSourceManagerMBean.java:366)  at com.sun.jmx.interceptor.DefaultMBeanServerInterceptor.getAttribute(DefaultMBeanServerInterceptor.java:678)  at com.sun.jmx.mbeanserver.JmxMBeanServer.getAttribute(JmxMBeanServer.java:651)  at com.blueware.monitor.collector.jmx.JmxService.a(JmxService.java)  at com.blueware.monitor.collector.jmx.JmxService.a(JmxService.java)  at com.blueware.monitor.collector.jmx.JmxService.beforeHarvest(JmxService.java)  at com.blueware.monitor.collector.stats.HarvestServiceImpl.a(HarvestServiceImpl.java)  at com.blueware.monitor.collector.stats.HarvestServiceImpl.a(HarvestServiceImpl.java)  at com.blueware.monitor.collector.stats.e.g(e.java)  at com.blueware.monitor.collector.stats.e.f(e.java)  at com.blueware.monitor.collector.stats.e.run(e.java)  at com.blueware.monitor.util.g.run(g.java)  at java.util.concurrent.Executors$RunnableAdapter.call(Executors.java:450)  at java.util.concurrent.FutureTask$Sync.innerRunAndReset(FutureTask.java:328)  at java.util.concurrent.FutureTask.runAndReset(FutureTask.java:161)  at java.util.concurrent.ScheduledThreadPoolExecutor$ScheduledFutureTask.access$101(ScheduledThreadPoolExecutor.java:109)  at java.util.concurrent.ScheduledThreadPoolExecutor$ScheduledFutureTask.runPeriodic(ScheduledThreadPoolExecutor.java:191)  at java.util.concurrent.ScheduledThreadPoolExecutor$ScheduledFutureTask.run(ScheduledThreadPoolExecutor.java:215)  at java.util.concurrent.ThreadPoolExecutor$Worker.runTask(ThreadPoolExecutor.java:908)  at java.util.concurrent.ThreadPoolExecutor$Worker.run(ThreadPoolExecutor.java:931)  at java.lang.Thread.run(Thread.java:773)  Caused by: java.sql.SQLException: com.mchange.v2.c3p0.PoolBackedDataSource@3acae63 [ connectionPoolDataSource -> com.mchange.v2.c3p0.WrapperConnectionPoolDataSource@6fa3e8ea [ acquireIncrement -> 5, acquireRetryAttempts -> 30, acquireRetryDelay -> 1000, autoCommitOnClose -> false, automaticTestTable -> null, breakAfterAcquireFailure -> false, checkoutTimeout -> 0, connectionCustomizerClassName -> null, connectionTesterClassName -> com.mchange.v2.c3p0.impl.DefaultConnectionTester, debugUnreturnedConnectionStackTraces -> false, factoryClassLocation -> null, forceIgnoreUnresolvedTransactions -> false, identityToken -> 1bqorbo9g19yj9d71w4paqq|-187ef8d7, idleConnectionTestPeriod -> 300, initialPoolSize -> 50, maxAdministrativeTaskTime -> 0, maxConnectionAge -> 0, **maxIdleTime -> 120, maxIdleTimeExcessConnections -> 0, maxPoolSize -> 500, maxStatements -> 2000, maxStatementsPerConnection -> 0, minPoolSize -> 50**, nestedDataSource -> com.mchange.v2.c3p0.DriverManagerDataSource@3dbbcabd [ description -> null, driverClass -> null, factoryClassLocation -> null, identityToken -> 1bqorbo9g19yj9d71w4paqq|-646c9f5d, jdbcUrl -> jdbc:oracle:thin:@bpmdb:1521:ORCL, properties -> {user=\*\*\*\*\*\*, password=\*\*\*\*\*\*} ], **preferredTestQuery -> null, propertyCycle -> 0, statementCacheNumDeferredCloseThreads -> 0, testConnectionOnCheckin -> false, testConnectionOnCheckout -> false**, unreturnedConnectionTimeout -> 0, usesTraditionalReflectiveProxies -> false; userOverrides: {} ], dataSourceName -> null, factoryClassLocation -> null, identityToken -> 1bqorbo9g19yj9d71w4paqq|60cdb265, numHelperThreads -> 3 ] has been closed() -- you can no longer use it.  at com.mchange.v2.c3p0.impl.AbstractPoolBackedDataSource.assertCpds(AbstractPoolBackedDataSource.java:507)  at com.mchange.v2.c3p0.impl.AbstractPoolBackedDataSource.getPoolManager(AbstractPoolBackedDataSource.java:519)  at com.mchange.v2.c3p0.impl.AbstractPoolBackedDataSource.getNumBusyConnections(AbstractPoolBackedDataSource.java:170)  ... 24 more |

* + 1. 索引

以下查询语句第一次比较慢：

|  |
| --- |
| SELECT rpi.ACCOUNT AS BusinessId  ,replace(cai.OPENDATE, '.', '-') AS PayDate  ,cai.FINANCEORG AS PayAgency  ,cai.TYPE  ,cai.CREDITLIMITAMOUNT AS CreditAmount  ,cai.GUARANTEETYPE AS GuaranteeType  ,cai.ACCOUNTSTATUS AS STATE  ,rpi.SHARECREDITLIMITAMOUNT AS ShareAmount  ,rpi.USEDCREDITLIMITAMOUNT AS UsedAmount  ,rpi.LATEST6MONTHUSEDAVGAMOUNT AS AvgUsedAmountLast6Month  ,rpi.USEDHIGHESTAMOUNT AS MaxUseAmount  ,rpi.SCHEDULEDPAYMENTAMOUNT AS CurMonthNeedRepay  ,replace(rpi.SCHEDULEDPAYMENTDATE, '.', '-') AS BillDate  ,rpi.ACTUALPAYMENTAMOUNT AS CurMonthActualRepay  ,replace(rpi.RECENTPAYDATE, '.', '-') AS LastRepayDate  ,cod.CURROVERDUECYC AS CurOverDueNum  ,cod.CURROVERDUEAMOUNT AS CurOverdueAmount  ,cod.OVERDUEOVER180AMOUNT AS UnpaidBalanceOverdraw180Days  ,CURRENCY  FROM BPMAP.CREDITINFO\_PBC\_AWARDCREDITINFO cai  LEFT JOIN BPMAP.CREDITINFO\_PBC\_REPAYINFO rpi ON cai.REPORTSN = rpi.REPORTSN  AND cai.ACCOUNT = rpi.ACCOUNT  AND cai.INFO\_ID = rpi.INFO\_ID  LEFT JOIN BPMAP.CREDITINFO\_PBC\_CURROVERDUE cod ON cod.INFO\_ID = cai.INFO\_ID  AND cod.REPORTSN = cai.REPORTSN  AND cod.ACCOUNT = cai.ACCOUNT  WHERE cai.INFO\_ID = 'AC9A0F9118BE452CB594913A11160B94'  AND cai.APPLICATION\_NUMBER = 'BO20160516002462'  AND cai.TYPE = '贷记卡'; |

CREDITINFO\_PBC\_AWARDCREDITINFO没有把查询关键字REPORTSN加索引：



## 解决办法：

* + 1. 数据源

persistence.xml增加以下配置：

<property name="hibernate.c3p0.idle\_test\_period">300</property>

<property name="hibernate.c3p0.testConnectionOnCheckout">true</property>

<property name="hibernate.c3p0.preferredTestQuery">SELECT 1</property>

* + 1. 索引

新增索引：

CREATE INDEX PBC\_AWC\_RPTSN ON CREDITINFO\_PBC\_AWARDCREDITINFO(REPORTSN);