

同程旅行千亿级应用日志平台架构演进

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<http://www.itpub.net/>

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04.未来展望

Part1:目标

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日志规模

1600亿

条数/天

280万

条/秒

300TB

原始大小/天

<http://www.itpub.net/>

目标

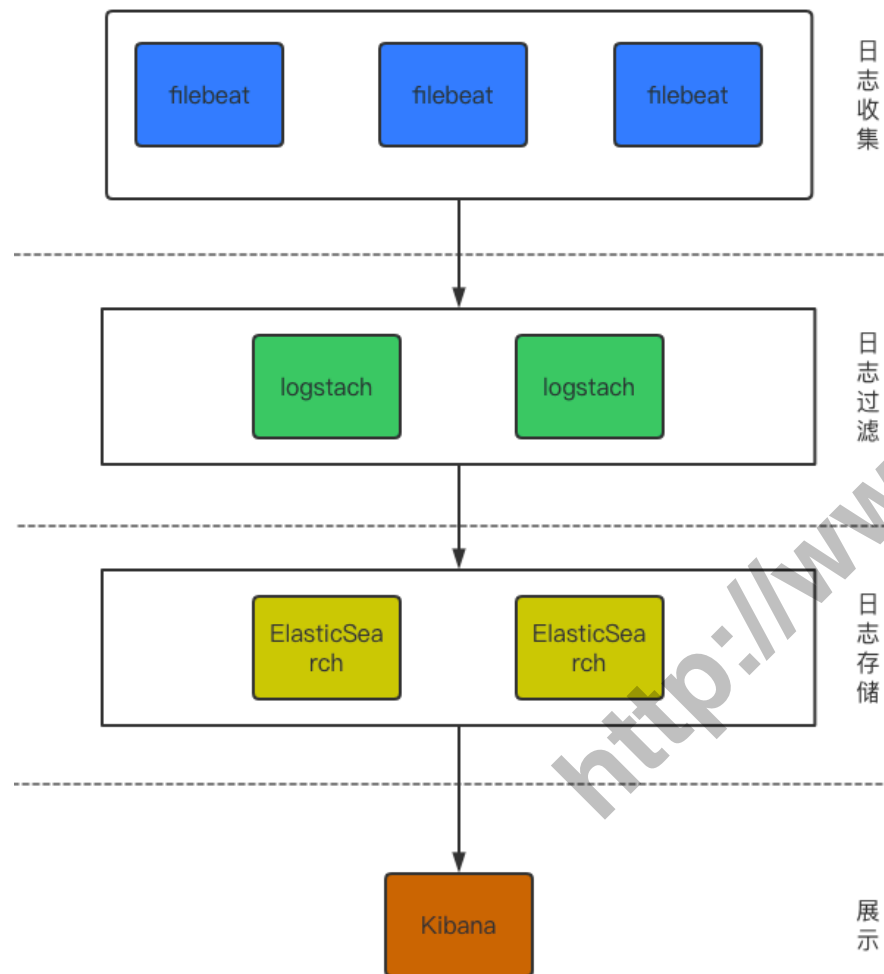
1. 快-延迟低,查询快
2. 高可用-可用率高,扩展性好
3. 功能强大-不仅仅是个日志查询平台
4. 性价比高

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Part2:架构演进

<http://www.itpub.net/>

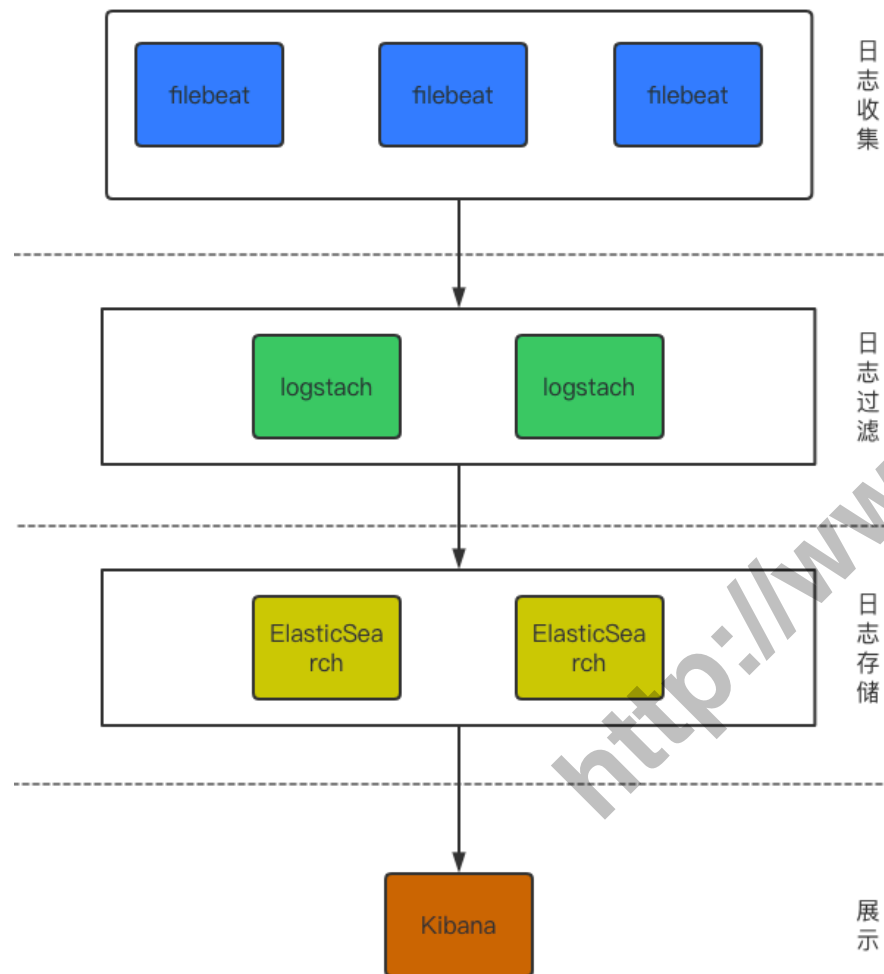
架构演进-v1



ELK

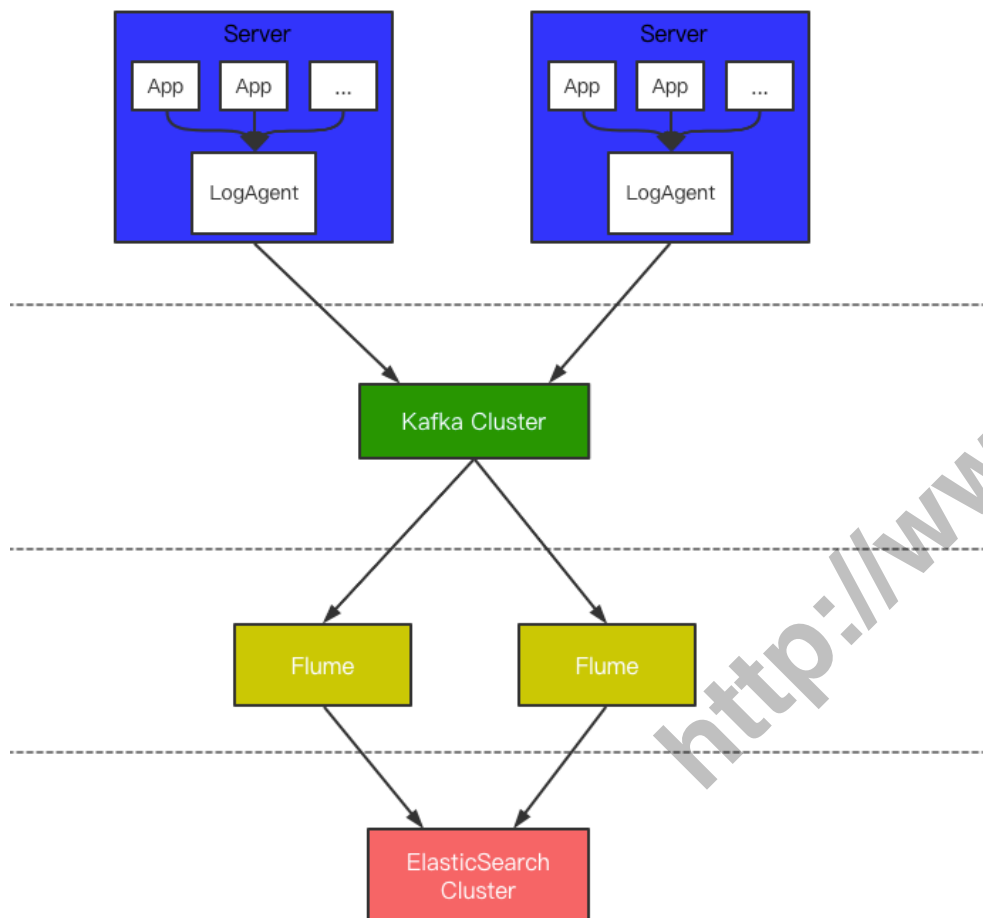
简单

架构演进-v1



1. Logstash性能以及扩展性不太好
2. Es故障时影响较大

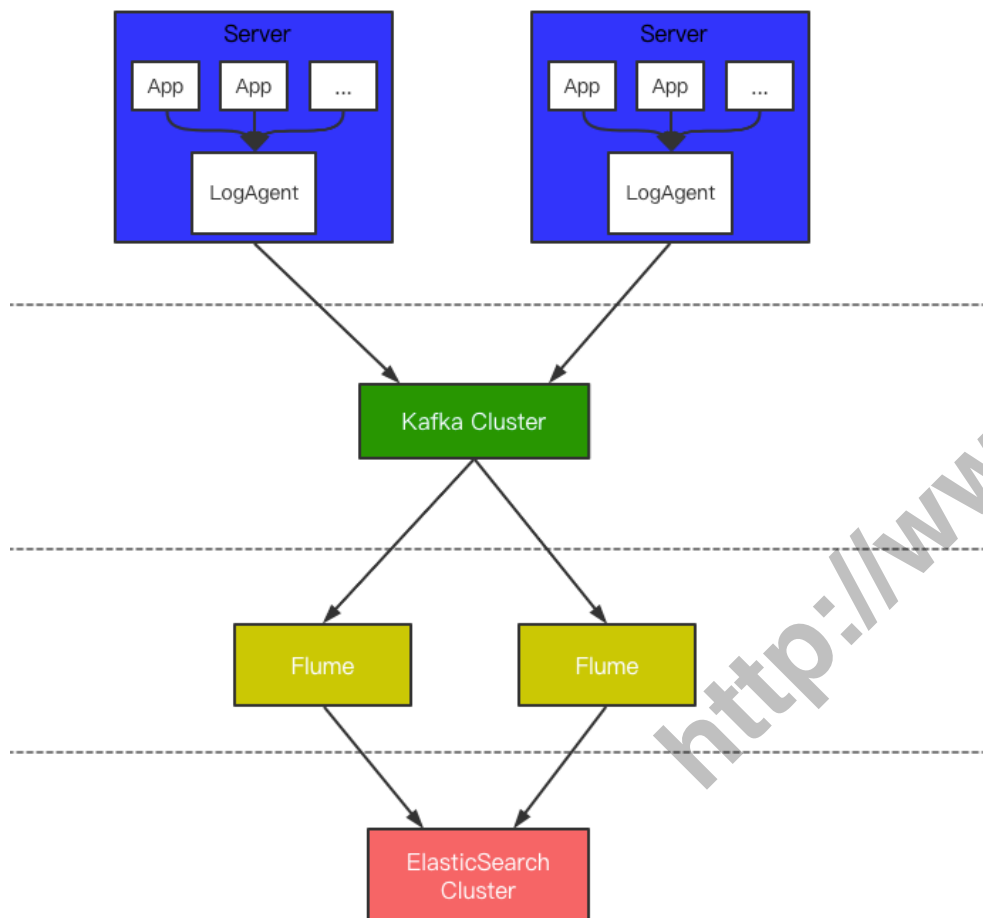
架构演进-v2



1. 扩展了filebeat,支持thrift接口写入数据
2. 引入kafka
3. Logstash改为flume

1. 采集端与存储端解耦,可以互不影响
2. 支持非文件采集的日志收集
3. 引入了更轻量且扩展性、性能更好的flume

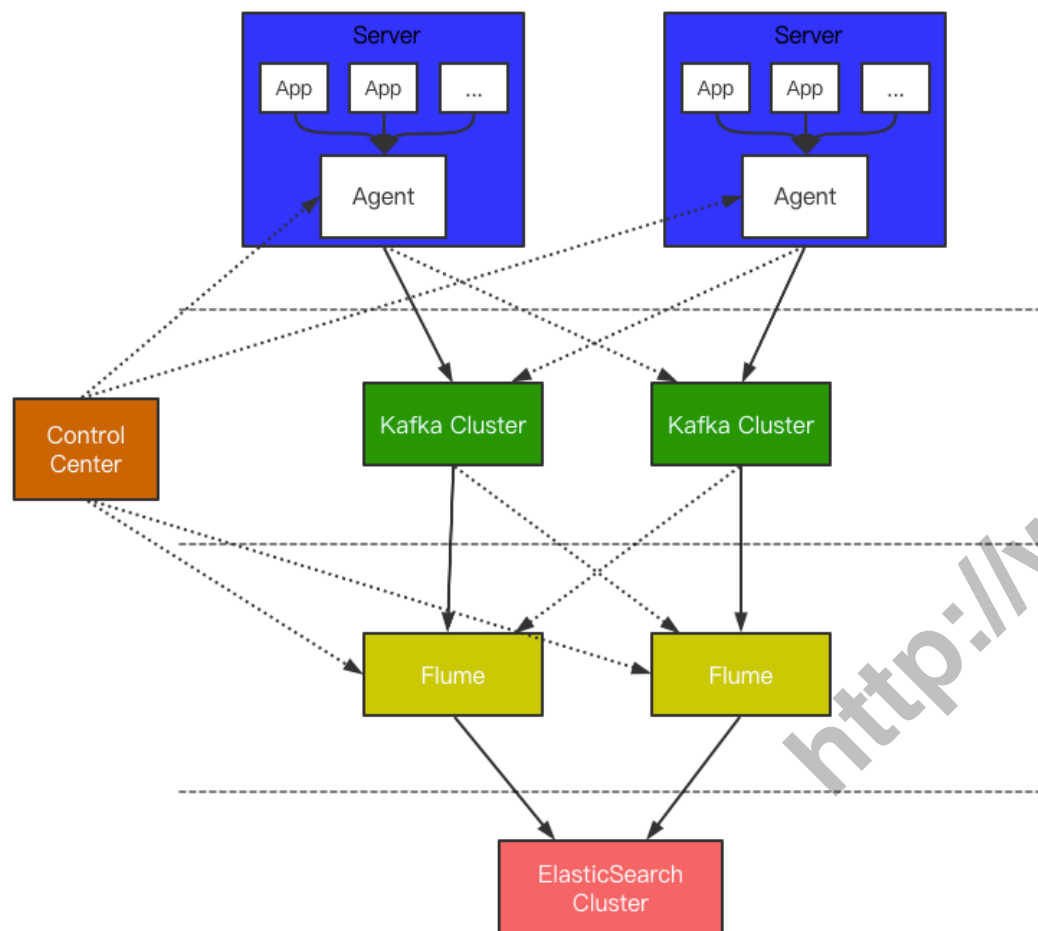
架构演进-v2



1.Flume持续full gc假死

2.Kafka单点,Kafka无响应 [bug](#)

架构演进-v2



1.Flume 假死

新增dualSelector. Memory Channel与File Channel 自动切换
修改了KafkaSource,支持自动上下线,能者多劳

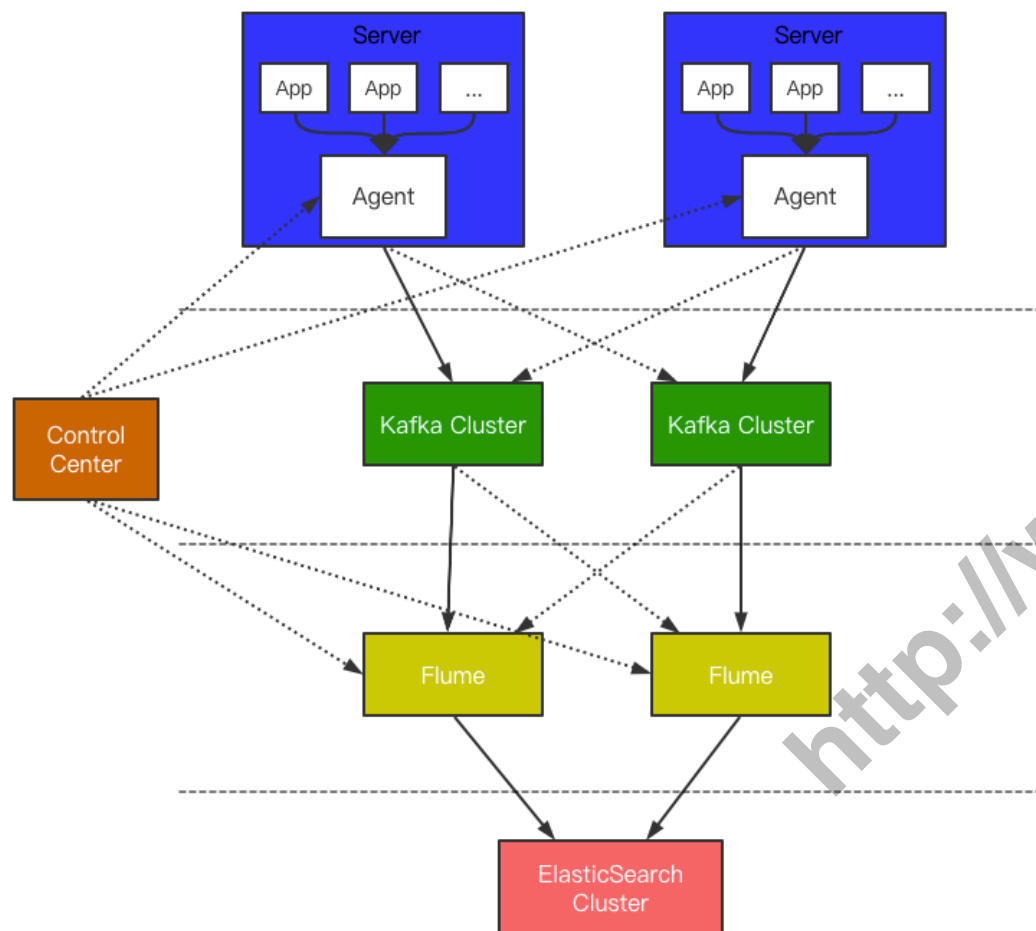
2.Kafka单点

0.10.1.0 -> 0.10.1.1 [bug](#)
部署多套kafka集群

3.新增Control Center。

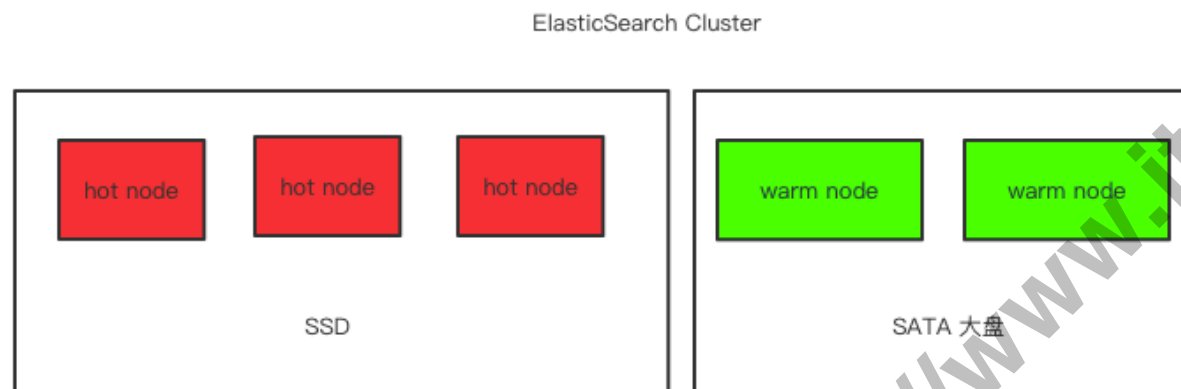
控制agent 发送的kafka地址
控制flume消费的kafka地址

架构演进-v2



Elasticsearch 单点

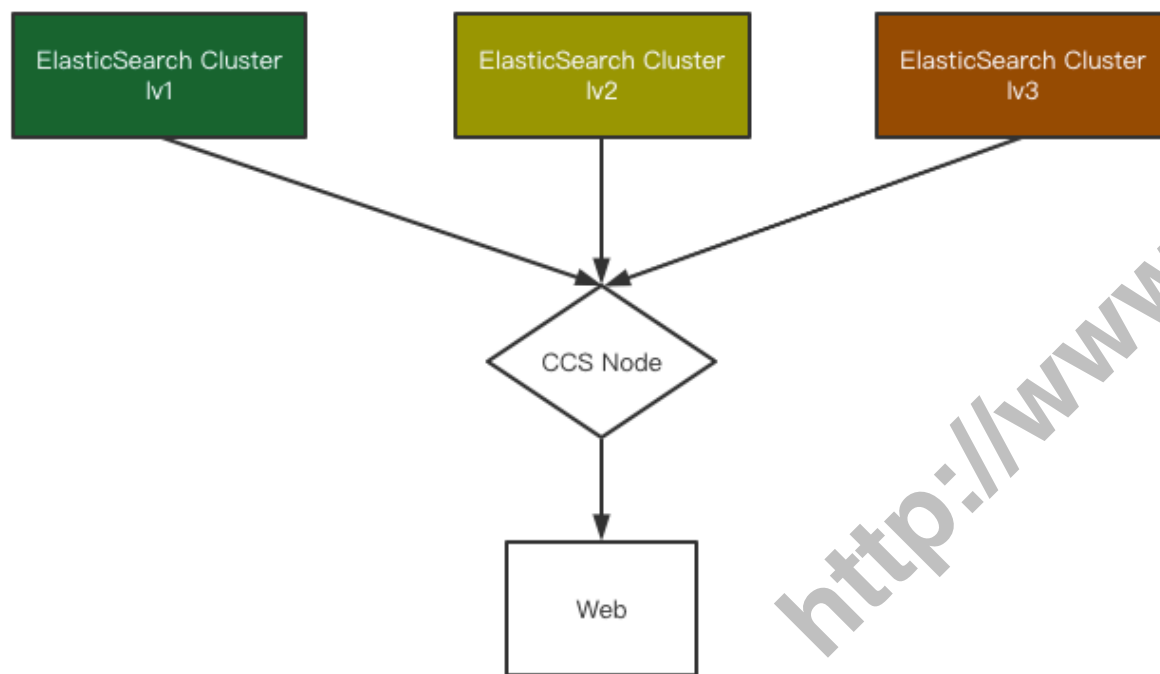
架构演进-v2-单es集群部署



Hot节点,SSD 高配,支撑实时数据

Warm节点,大盘低配机器,存储历史数据

架构演进-v3



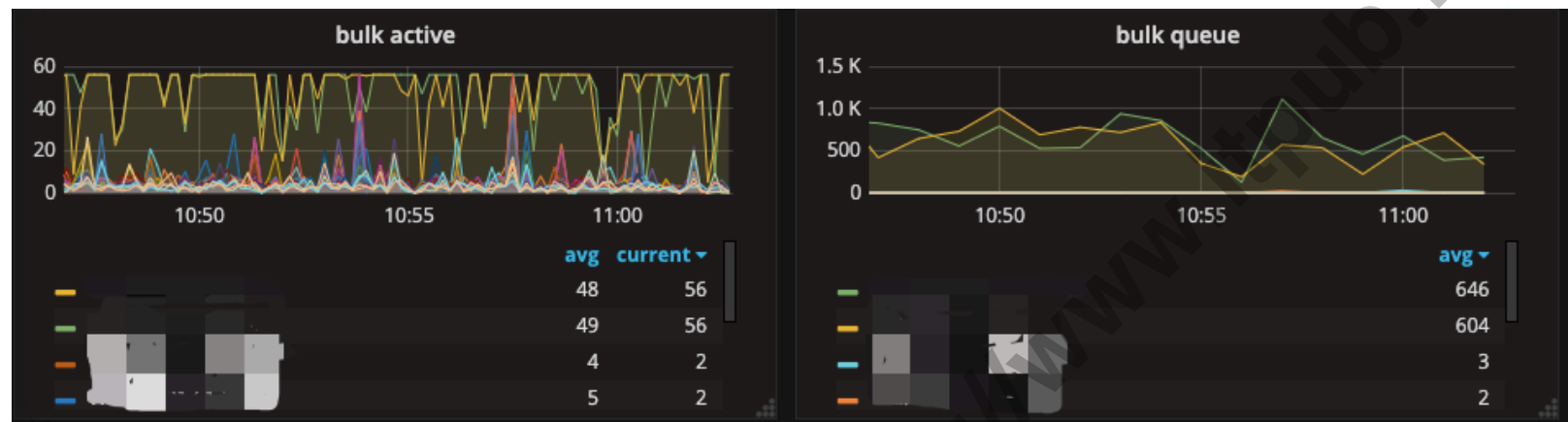
90%的项目 占比日志条数 15%

Lv1集群,15%的总量,小规模,高保障,性能强

Lv2集群,85%的总量,大规模,高保障,性能优

Lv3集群,X%的总量,warm节点,实时要求低,性能一般

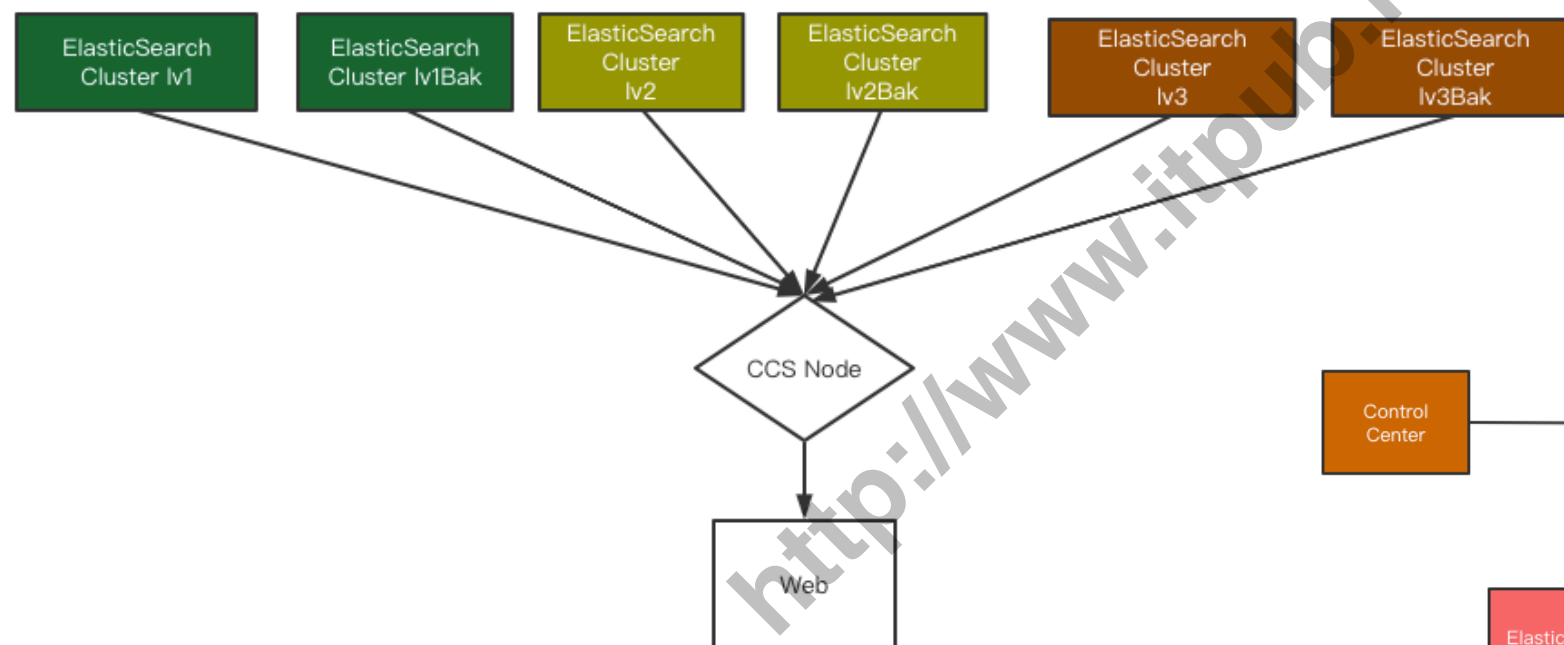
架构演进-v3



长尾 等等原因,集群响应慢。

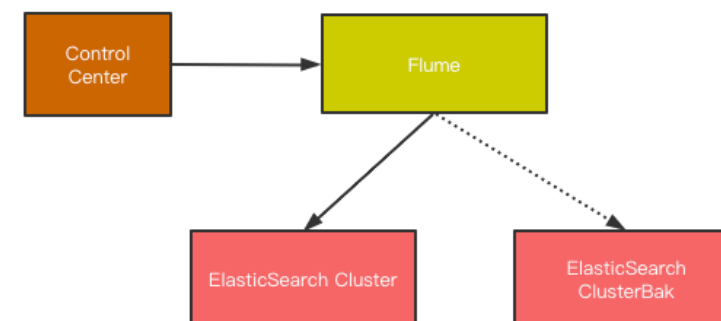
影响所有写入与查询

架构演进-v3



Bak集群

- 1: 能力与主集群一致
- 2: 资源低,heap等
- 3: 能快速调整,随时上线
- 4: 长期运行



架构演进-总结

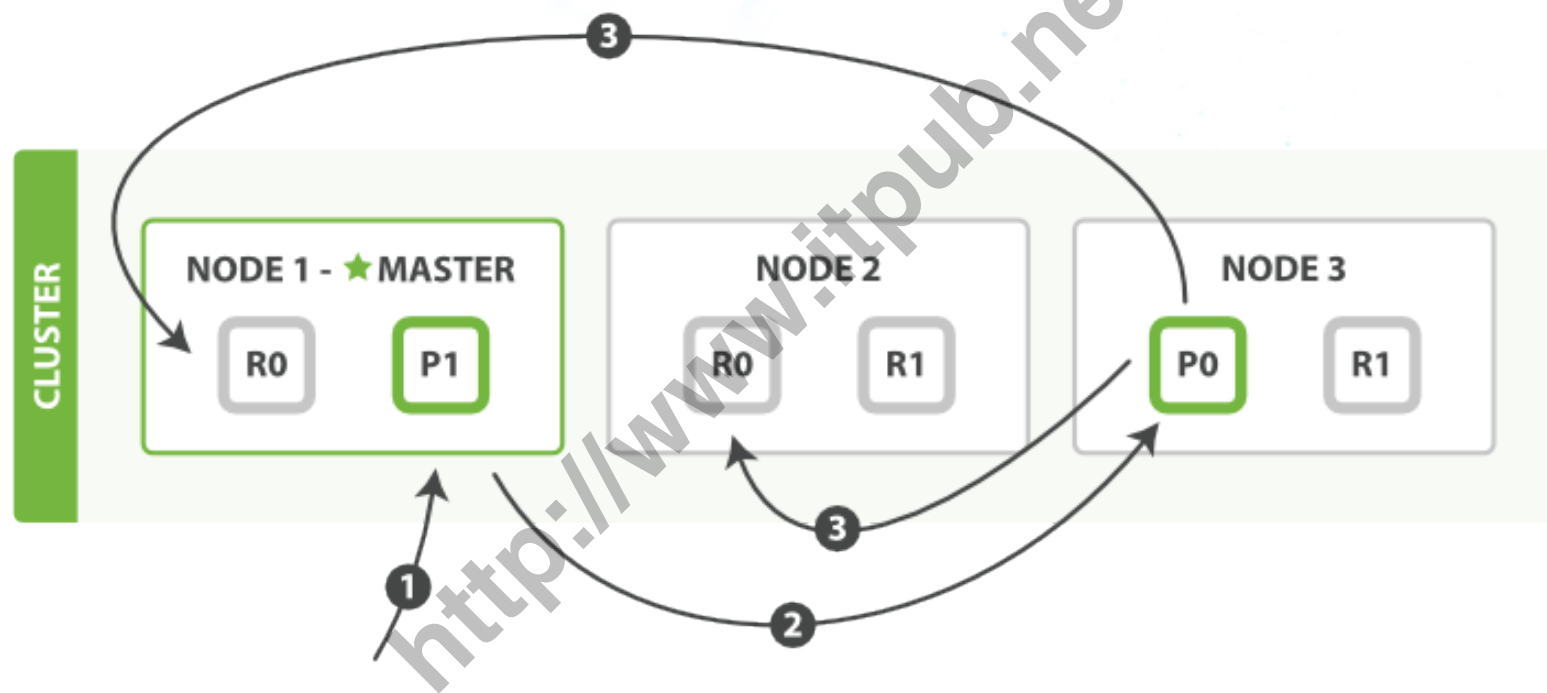
所有流量都可以动态切换,无任何单点

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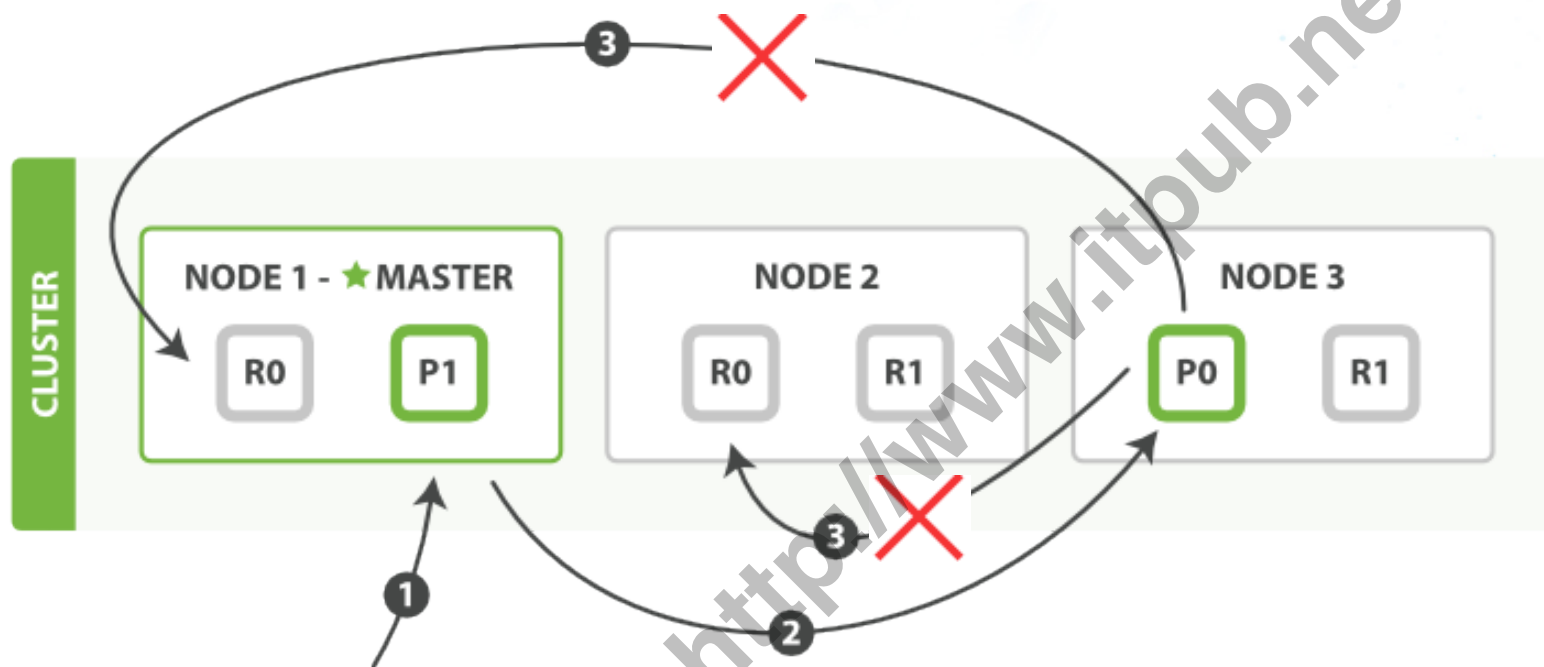
Part3:挑战与收益

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挑战-性能与成本



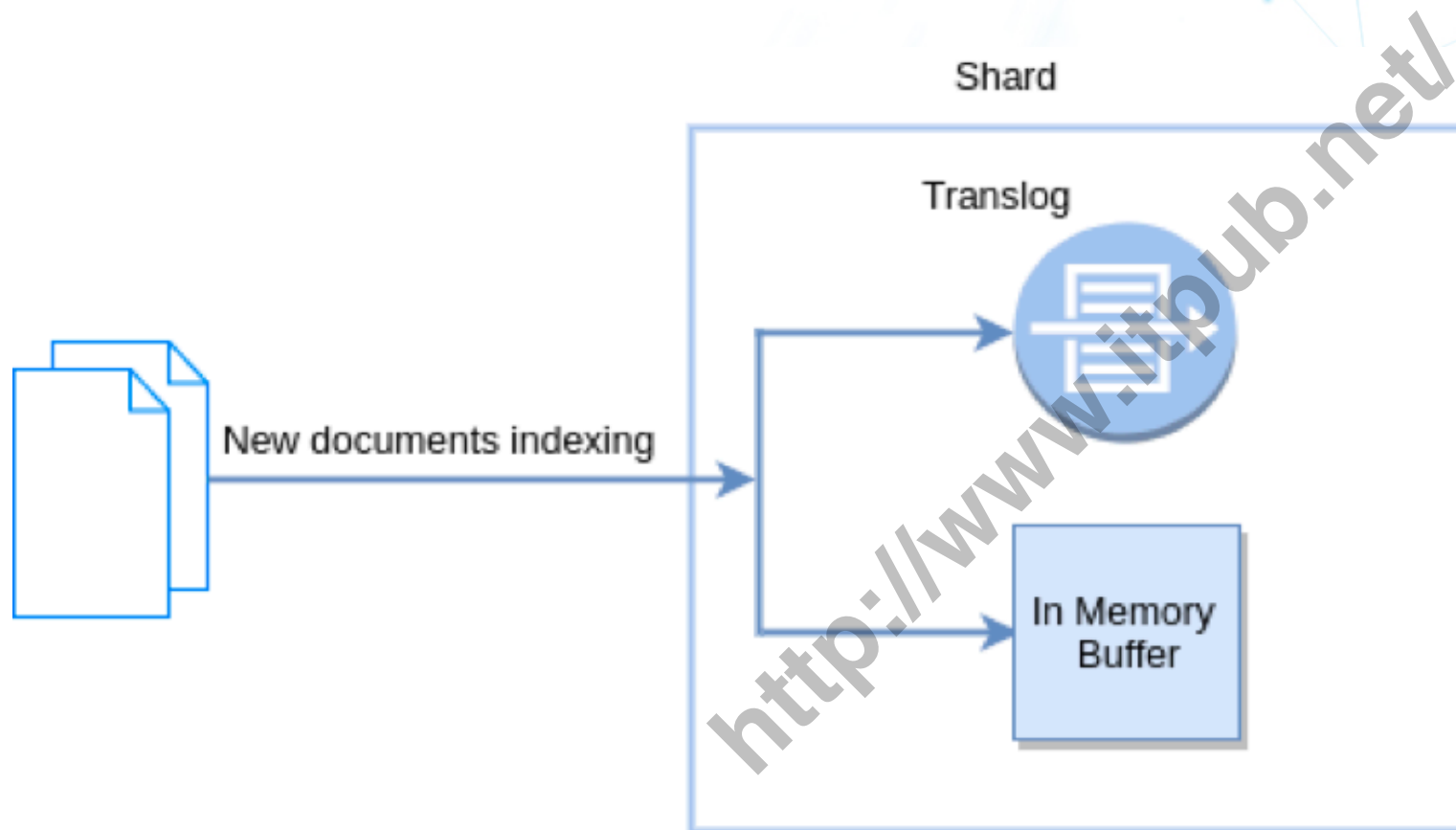
挑战-性能与成本-收益



number_of_replicas:0

性能提升 100%+

挑战-性能与成本



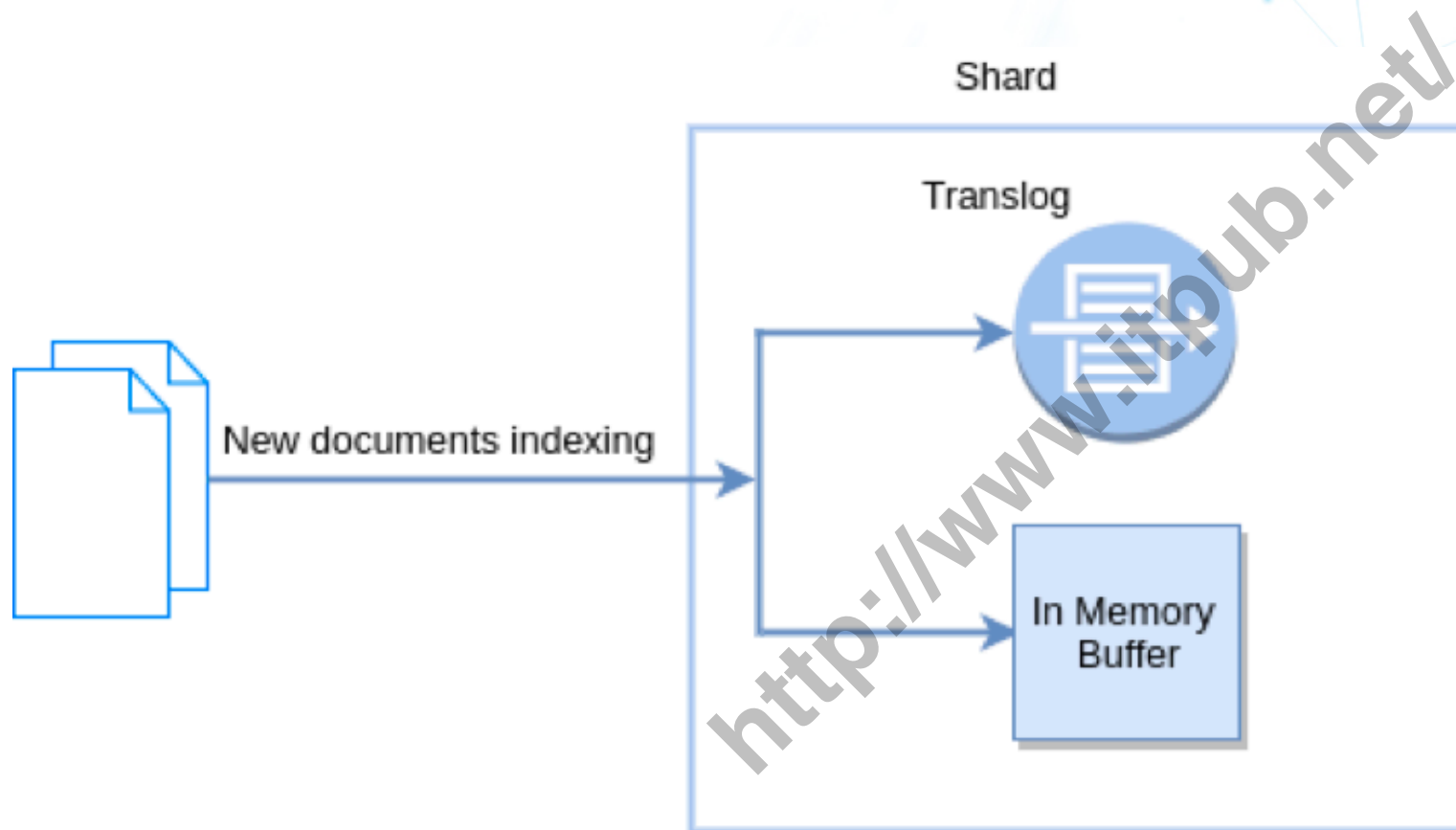
Tranlog的作用

- 1.恢复时数据回放
- 2.Realtime get

~~99%~~

图片来源: <https://qbox.io/blog/refresh-flush-operations-elasticsearch-guide>

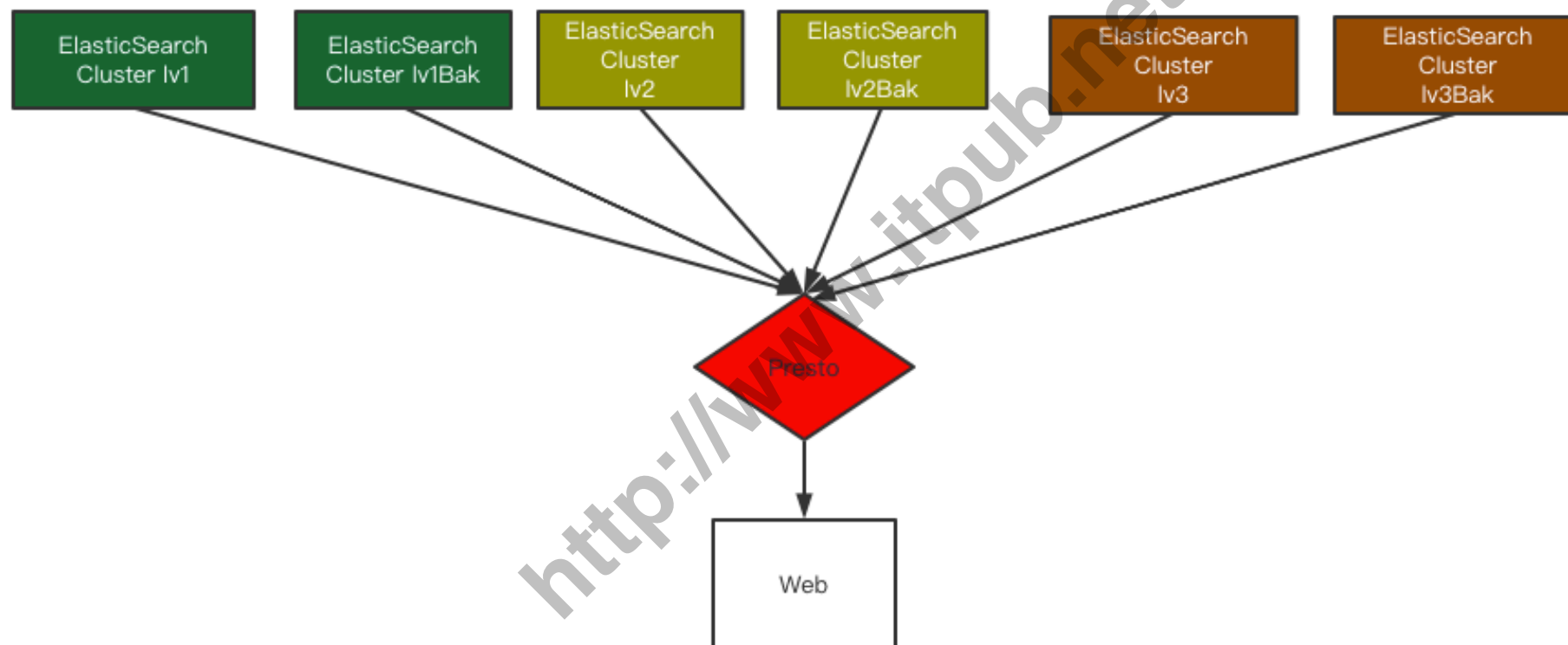
挑战-性能与成本-收益



80%性能提升

图片来源: <https://qbox.io/blog/refresh-flush-operations-elasticsearch-guide>

挑战-Es在AP能力弱

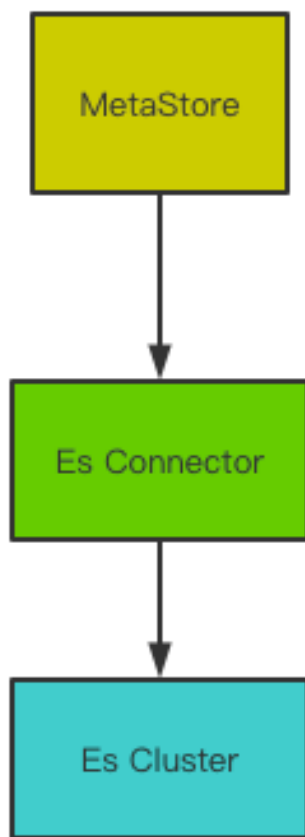


挑战-Es在AP能力弱

1. 获取原信息慢
2. Shard级别的并发,es集群压力较大

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挑战-Es在AP能力弱



MetaStore: 存储es源信息,如shard信息等

Node级别的并发+限速

本地扫描

谓词下推

部分limit下推

...

挑战-Es在AP能力弱-收益

```
select split(split(msg,'serverEndpoint:')[2],', mgr')[1],count(1) from skynet_all_102781 where priority = 2  
and dt = '20200916' and logtime > '2020-09-16 11:20:00.000' and logtime < '2020-09-16 12:40:00.000'  
and msg like '%Redis.RedisTimeoutException%' and ip = '' group by split(split(msg,'serverEndpoint:')[2],', mgr')[1]
```

```
SELECT filter1,count(1) from (  
SELECT filter1,"json_size"(split(msg,'返回结果:')[2], '$.modules') from skynet_all_103421  
where dt = '20181009' and hour = '12' and sub_category='output' and category='heart' and module = 'warden'  
and msg not like '%wisp.exe%'  
group by filter1,"json_size"(split(msg,'返回结果:')[2], '$.modules')  
) t GROUP by filter1 HAVING count(1) > 1
```

支持实时在线做数据的分析统计

挑战-日志无上下文

什么情况下触发了ERROR日志

日志链路 调用链路 展开 2020-10-09 14:36:20.954 ERROR 172.19.103.199(logicidc_hd1) [skynet] [/api/monitor/rule/detail] [search] [] 输入参数{"appId":102781,"beginTime":"2020-10-09 14:12:01.000","endTime":"2020-10-09 14:32:01.000","ruleId":"33514","cPage":1,"pageSize":50,"startRow":1}\norg.springframework.web.client.ResourceAccessException: I/O error on POST request for "http://...com/api/monitor/rule/detail": Read timed out; nested exception is java.net.SocketTimeoutException: Read timed out

```

at org.springframework.web.client.RestTemplate.doExecute(RestTemplate.java:696)
at org.springframework.web.client.RestTemplate.execute(RestTemplate.java:654)
at org.springframework.web.client.RestTemplate.exchange(RestTemplate.java:574)
at com.ly.infra.skyeye.metadata.service.api.skynet.SkynetAPIService.reqInternal(SkynetAPIService.java:207)
at com.ly.infra.skyeye.metadata.service.api.skynet.SkynetAPIService.request(SkynetAPIService.java:165)
at com.ly.infra.skyeye.metadata.service.api.skynet.SkynetAPIService.proxySearch(SkynetAPIService.java:136)
at com.ly.infra.skyeye.metadata.web.skynet.SkynetController.SkynetProxySearch(SkynetController.java:76)
at com.ly.infra.skyeye.metadata.web.skynet.SkynetController$$FastClassBySpringCGLIB$$ef13547d.invoke(<generated>)
at org.springframework.cglib.proxy.MethodProxy.invoke(MethodProxy.java:204)
at org.springframework.aop.framework.CglibAopProxy$CglibMethodInvocation.invokeJoinpoint(CglibAopProxy.java:746)
at org.springframework.aop.framework.ReflectiveMethodInvocation.proceed(ReflectiveMethodInvocation.java:163)
at com.elong.hotel.core.CheckListLogAspect.invoke(CheckListLogAspect.java:42)
at org.springframework.aop.framework.ReflectiveMethodInvocation.proceed(ReflectiveMethodInvocation.java:185)
at org.springframework.aop.interceptor.ExposeInvocationInterceptor.invoke(ExposeInvocationInterceptor.java:92)
at org.springframework.aop.framework.ReflectiveMethodInvocation.proceed(ReflectiveMethodInvocation.java:185)
at org.springframework.aop.framework.CglibAopProxy$DynamicAdvisedInterceptor.intercept(CglibAopProxy.java:688)
at com.ly.infra.skyeye.metadata.web.skynet.SkynetController$$EnhancerBySpringCGLIB$$6c373214.SkynetProxySearch(<generated>)
at sun.reflect.GeneratedMethodAccessor140.invoke(Unknown Source)
at sun.reflect.DelegatingMethodAccessorImpl.invoke(DelegatingMethodAccessorImpl.java:43)
at java.lang.reflect.Method.invoke(Method.java:498)
at org.springframework.web.method.support.InvocableHandlerMethod.doInvoke(InvocableHandlerMethod.java:209)
at org.springframework.web.method.support.InvocableHandlerMethod.invokeForRequest(InvocableHandlerMethod.java:136)
at org.springframework.web.servlet.mvc.method.annotation.ServletInvocableHandlerMethod.invokeAndHandle(ServletInvocableHandlerMethod.java:102)

```

挑战-日志无上下文

借助Java Agent,实现日志方法拦截
注入MDC
解析外部系统的mapping,如域名日志与traceId关系

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挑战-日志无上下文

日志链路	调用链路	2020-10-09 14:34:45.083 INF	[Time] [fastQuery] [构建结果] [] []耗时62ms
日志链路	调用链路	2020-10-09 14:34:45.083 INF	[基于分钟查询] [es获取] [] [goods-service-nb::com.elong.hotel.goods.goodservice.utils.StaticDetailOperUtil::batchGetAllStaticList] [2020-10-02 14:34:00] {"dataKey":null,"logTime":"2020-10-02 14:34:00","minute":"","day":"","month":"","id":"","serverName":"","serverGroup":"","executeCount":5390,"executeCountColor":"","exceptionRate":0.0,"exceptionRateColor":"","bizExceptionRate":0.0,"bizExceptionRateColor":"","avgExecuteTimespan":14.558,"avgExecuteTimespanColor":"","maxExecuteTimespan":260,"maxExecuteTimespanColor":"","exceptionCount":0,"bizExceptionCount":0,"computeNode":null,"totalTimeSpan":0.0,"totalTime":78468.0,"key":"2020-10-02 14:34:00","sumbizExceptionCount":{"value":0},"sumExceptionCount":{"value":0},"sumExecuteCount":{"value":5390},"sumTotalTimeSpan":{"value":78468},"maxExecuteTimeSpanAgg":{"value":260},"avgTop99ExecuteTime":{},"time":"2020-10-02 14:34:00","top99ExecuteTime":0.0}
日志链路	调用链路	2020-10-09 14:34:45.083 INFO	[基于分钟查询] [es获取] [] [goods-service-nb::com.elong.hotel.goods.goodservice.utils.StaticDetailOperUtil::batchGetAllStaticList] [2020-10-09 13:34:00] {"dataKey":null,"logTime":"2020-10-09 13:34:00","minute":"","day":"","month":"","id":"","serverName":"","serverGroup":"","executeCount":3428,"executeCountColor":"","exceptionRate":0.0,"exceptionRateColor":"","bizExceptionRate":0.0,"bizExceptionRateColor":"","avgExecuteTimespan":13.819,"avgExecuteTimespanColor":"","maxExecuteTimespan":138,"maxExecuteTimespanColor":"","exceptionCount":0,"bizExceptionCount":0,"computeNode":null,"totalTimeSpan":0.0,"totalTime":47372.0,"key":"2020-10-09 13:34:00","sumbizExceptionCount":{"value":0},"sumExceptionCount":{"value":0},"sumExecuteCount":{"value":3428},"sumTotalTimeSpan":{"value":47372},"maxExecuteTimeSpanAgg":{"value":138},"avgTop99ExecuteTime":{},"time":"2020-10-09 13:34:00","top99ExecuteTime":0.0}
日志链路	调用链路	2020-10-09 14:34:45.074 INFO	[基于分钟查询] [skyeeye默认新建] [] [goods-service-nb::com.elong.hotel.goods.goodservice.impl.ThriftProxyImpl::searchHotel] [2020-10-09 14:34:00] skyeeye默认新建
日志链路	调用链路	2020-10-09 14:34:45.074 INFO	[基于分钟查询] [skyeeye默认新建] [] [goods-service-nb::com.elong.hotel.goods.goodservice.impl.ThriftProxyImpl::searchHotel] [2020-10-02 14:34:00] skyeeye默认新建
日志链路	调用链路	2020-10-09 14:34:45.074 INFO	[基于分钟查询] [es获取] [] [goods-service-nb::com.elong.hotel.goods.goodservice.impl.ThriftProxyImpl::setMajiaRequest] [2020-10-02 14:34:00] {"dataKey":null,"logTime":"2020-10-02 14:34:00","minute":"","day":"","month":"","id":"","serverName":"","serverGroup":"","executeCount":8730,"executeCountColor":"","exceptionRate":0.0,"exceptionRateColor":"","bizExceptionRate":0.0,"bizExceptionRateColor":"","avgExecuteTimespan":20.444,"avgExecuteTimespanColor":"","maxExecuteTimespan":77,"maxExecuteTimespanColor":"","exceptionCount":0,"bizExceptionCount":0,"computeNode":null,"totalTimeSpan":0.0,"totalTime":178480.0,"key":"2020-10-02 14:34:00","sumbizExceptionCount":{"value":0},"sumExceptionCount":{"value":0},"sumExecuteCount":{"value":8730},"sumTotalTimeSpan":{"value":178480},"maxExecuteTimeSpanAgg":{"value":77},"avgTop99ExecuteTime":{},"time":"2020-10-02 14:34:00","top99ExecuteTime":0.0}
日志链路	调用链路	2020-10-09 14:34:45.073 INFO	[基于分钟查询] [es获取] [] [goods-service-nb::com.elong.hotel.goods.goodservice.impl.ThriftProxyImpl::setMajiaRequest] [2020-10-09 14:33:00] {"dataKey":null,"logTime":"2020-10-09 14:33:00","minute":"","day":"","month":"","id":"","serverName":"","serverGroup":"","executeCount":5280,"executeCountColor":"","exceptionRate":0.0,"exceptionRateColor":"","bizExceptionRate":0.0,"bizExceptionRateColor":"","avgExecuteTimespan":22.61,"avgExecuteTimespanColor":"","maxExecuteTimespan":49,"maxExecuteTimespanColor":"","exceptionCount":0,"bizExceptionCount":0,"computeNode":null,"totalTimeSpan":0.0,"totalTime":119380.0,"key":"2020-10-09 14:33:00","sumbizExceptionCount":{"value":0},"sumExceptionCount":{"value":0},"sumExecuteCount":{"value":5280},"sumTotalTimeSpan":{"value":119380},"maxExecuteTimeSpanAgg":{"value":49},"avgTop99ExecuteTime":{},"time":"2020-10-09 14:33:00","top99ExecuteTime":0.0}

挑战-日志无上下文-收益

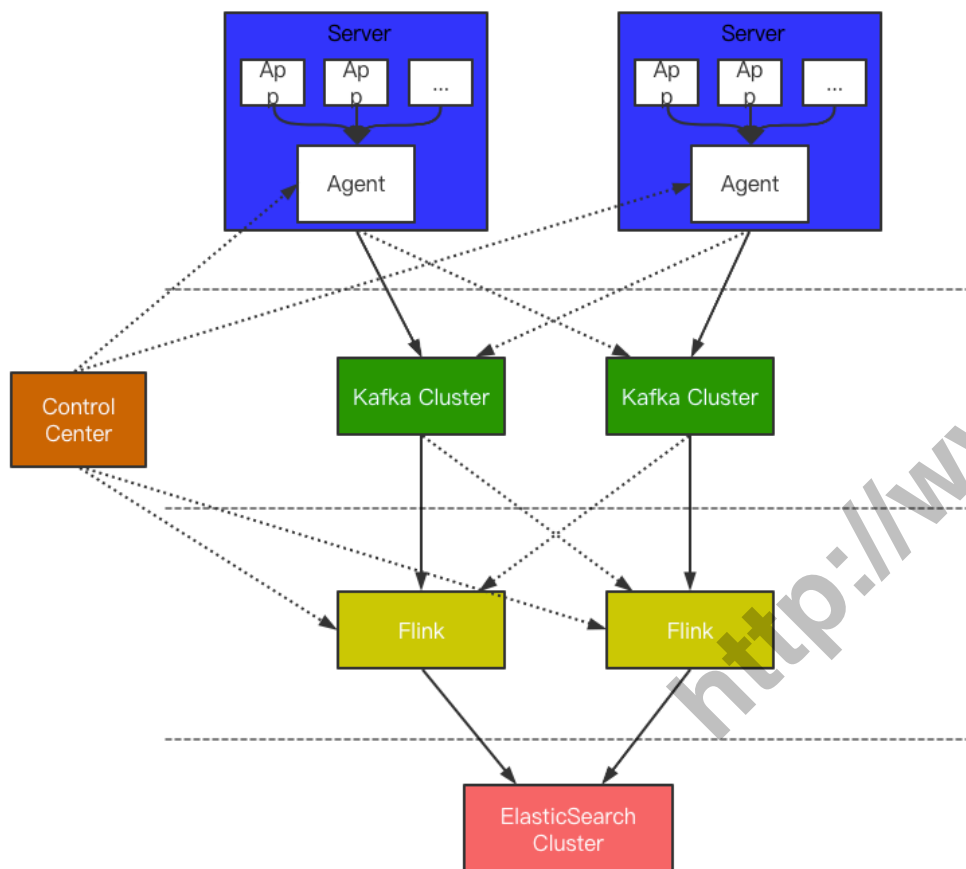
tcbase.java.skynetlogv2	2020-10-09 14:25:09.585	INFO	[REDACTED]
tcbase.java.skynetlogv2	2020-10-09 14:25:09.559	INFO	[REDACTED]
tcbase.java.skynetlogv2	2020-10-09 14:25:09.559	INFO	[REDACTED]
tcbase.java.skynetlogv2	2020-10-09 14:25:09.558	INFO	用户验证, 用户名: 赵明 WUJID
tcbase.java.skynetlogv2	2020-10-09 14:25:09.557	INFO	1204213原工号获取用户权限
tcbase.java.skynetlogv2	2020-10-09 14:25:09.557	INFO	1204213新工号获取用户权限
tcbase.java.skynetlogv2	2020-10-09 14:25:09.556	INFO	skyeye 用户设置 1204213
TLB	2020-10-09 14:25:09.555	INFO	详情 请求url: http://www.itpub.net/ api/skyeye/logs;耗时=39ms
infrascs.java.skyeye.api	2020-10-09 14:25:09.553	INFO	请求ip10.181.18.22, 172.30.109.11, 172.19.28.155
TLB	2020-10-09 14:25:09.528	INFO	详情 请求url: http://www.itpub.net/ om/skynet/logs/search/api/skyeye/logs;耗时=80ms
TLB	2020-10-09 14:25:09.370	INFO	详情 请求url: http://www.itpub.net/ i/proxy/skynet/logs/search/api/skyeye/logs;耗时=247ms

挑战-监控报警原始数据浪费

原始数据特别大,但是我仅仅只想做个监控报警

<http://www.itpub.net/>

挑战-监控报警原始数据浪费



```

2020-10-09 14:54:16.720 INFO <@skynetBiz><47>1594722146095,frameworklog,null,prod_pro-2020.05.03,3394311,6788622,0,0,0,0,0,2048.0,1602226456718,rate,prod_pro-2020.05.03
2020-10-09 14:54:16.720 INFO <@skynetBiz><47>1594722146095,frameworklog,null,prod_pro-2020.04.01,4270573,8541146,0,0,0,0,0,2252.8,1602226456718,rate,prod_pro-2020.04.01
2020-10-09 14:54:16.720 INFO <@skynetBiz><47>1594722146095,frameworklog,null,prod_pro-2020.03.16,135780,271560,0,0,0,0,0,72.3,1602226456718,rate,prod_pro-2020.03.16
2020-10-09 14:54:16.720 INFO <@skynetBiz><47>1594722146095,frameworklog,null,cc-rocketmq-2020.10.07,0,0,0,0,0,0,0,0,0,1602226456718,rate,cc-rocketmq
2020-10-09 14:54:16.720 INFO <@skynetBiz><47>1594722146095,frameworklog,null,prod_pro-2020.05.22,3588577,7177154,0,0,0,0,0,2048.0,1602226456718,rate,prod_pro-2020.05.22
2020-10-09 14:54:16.720 INFO <@skynetBiz><47>1594722146095,frameworklog,null,prod_pro-2020.07.17,2861153,5722306,0,0,0,0,0,1740.8,1602226456718,rate,prod_pro-2020.07.17
2020-10-09 14:54:16.720 INFO <@skynetBiz><47>1594722146095,frameworklog,null,prod_pro-2020.05.21,3576996,7153992,0,0,0,0,0,2048.0,1602226456718,rate,prod_pro-2020.05.21
2020-10-09 14:54:16.720 INFO <@skynetBiz><47>1594722146095,frameworklog,null,prod_pro-2020.04.25,3203819,6407638,0,0,0,0,0,2048.0,1602226456718,rate,prod_pro-2020.04.25
2020-10-09 14:54:16.720 INFO <@skynetBiz><47>1594722146095,frameworklog,null,prod_pro-2020.03.29,4241582,8483164,0,0,0,0,0,2252.8,1602226456718,rate,prod_pro-2020.03.29
2020-10-09 14:54:16.720 INFO <@skynetBiz><47>1594722146095,frameworklog,null,prod_pro-2020.04.04,4317020,8634040,0,0,0,0,0,2252.8,1602226456718,rate,prod_pro-2020.04.04
2020-10-09 14:54:16.720 INFO <@skynetBiz><47>1594722146095,frameworklog,null,prod_pro-2020.07.05,2871085,5742170,0,0,0,0,0,1740.8,1602226456718,rate,prod_pro-2020.07.05
2020-10-09 14:54:16.720 INFO <@skynetBiz><47>1594722146095,frameworklog,null,prod_pro-2020.06.20,3122805,6245610,0,0,0,0,0,1945.6,1602226456718,rate,prod_pro-2020.06.20
2020-10-09 14:54:16.720 INFO <@skynetBiz><47>1594722146095,frameworklog,null,test-index-2020-08-20,249718,499436,0,0,0,0,0,72.7,1602226456718,rate,test-index
2020-10-09 14:54:16.720 INFO <@skynetBiz><47>1594722146095,frameworklog,null,prod_pro-2020.05.05,3394733,6789466,0,0,0,0,0,2048.0,1602226456718,rate,prod_pro-2020.05.05
2020-10-09 14:54:16.720 INFO <@skynetBiz><47>1594722146095,frameworklog,null,prod_pro-2020.03.18,138935,277870,0,0,0,0,0,73.5,1602226456718,rate,prod_pro-2020.03.18
2020-10-09 14:54:16.720 INFO <@skynetBiz><47>1594722146095,frameworklog,null,null,0,0,0,0,0,0,0,0,0,13045.887281035795,26091.77456207159,0,0,0,1602226456718,sum,null
  
```

仅需要记录一条日志

Agent识别监控原始数据至独立topic

Flink计算dashboard数据以及报警

Dashboard数据存入es用来展示

挑战-监控报警原始数据浪费

ID	名称	字段详情	操作
6	sysparsenull	gmt_create:string, oepCityCode:string, arrCityCode:string, oepUate:string, retUate:string	编辑
7	inbmonitor	k1:string, k2:string, k3:string, k4:string, k5:string, v1:bigint, v2:bigint, tracerid:string, appUk:string	编辑
8	linktracker	traceld:string, contextId:string, memberId:string, serialNo:string, applicationId:string, sceneType:bigint, requestUrl:string, busiModel:bigint, usedTime:bigint, createTime:bigint, responseTime:bigint, isAsyn:bigint, logType:bigint, ex1:string, ex2:string	编辑
9	hotelordercreatesystemmonitorin...	CustomerSerialId:bigint, OrderSerialId:string, CreateDate:string, B2CUserId:bigint, StartDate:string, EndDate:string, HotelId:bigint, RoomId:bigint, PolicyId:bigint, IsCtripElong:string, IsOrderCreate:string, FailCodeId:bigint, FailMessage:string, AllAmount:bigint, Pay...	编辑
10	hotelpaynotifyindex	CustomerSerialId:bigint, OrderSerialId:string, CreateDate:bigint, FailMessage:string, FailCode:bigint, IsSuccess:string, SpecificErrorMessage:string, ext1:string, ext2:string	编辑
11	hotelorderrefundindex	CustomerSerialId:bigint, OrderSerialId:string, CreateDate:bigint, RefundFrom:bigint, RefundFromName:string, FailMessage:string, FailCode:bigint, IsSuccess:string, RefundType:bigint, RefundTypeName:string, RefundReasonId:bigint, RefundReasonName:string...	编辑
12	hotelincrementprocessindex	CustomerSerialId:bigint, OrderSerialId:string, CreateDate:bigint, SourceFrom:bigint, FailCodeId:bigint, FailMessage:string, IsSuccess:string, ExternalSerialId:string, SourceFromName:string, SpecificErrorMessage:string, ext1:string, ext2:string	编辑
13	distributionbookablecheck	DistributorId:bigint, HotelId:bigint, RoomId:bigint, PolicyId:bigint, ComeDate:bigint, ComeTime:bigint, LeaveDate:bigint, BookingCount:bigint, GuestCount:bigint, CanBooking:bigint, ErrorMessage:string, SourceFrom:bigint, CalendarTime:bigint, BookableTime:bigi...	编辑
14	hotelordersearchtimesindex	CreateDate:bigint, Channel:string, SearchTimes:bigint, Ex:object	编辑
15	hotelorderinsuranceindex	CustomerSerialId:bigint, OrderSerialId:string, BpSerNo:string, CreateDate:bigint, BuyInsuranceFrom:bigint, BuyInsuranceFromName:string, FailMessage:string, FailCode:bigint, IsSuccess:bigint, BuyInsuranceType:bigint, BuyInsuranceTypeName:string, Specific...	编辑
16	hotelorderswitchcreateindex	CustomerSerialId:string, OrderSerialId:string, SubOrderSerialId:string, CreateDate:bigint, B2CUserId:bigint, HotelId:bigint, RoomId:bigint, PolicyId:bigint, IsSwitchOrderCreate:bigint, FailCodeId:bigint, FailMessage:string, ClientType:bigint, PlatformId:bigint, Specifi...	编辑
17	hotelbillapplyindex	CustomerSerialId:string, OrderSerialId:string, CreateDate:bigint, BillType:bigint, InvoiceId:bigint, SpecificErrorMessage:string, IsSuccess:bigint, ex:object	编辑
18	hotelctriporderpushindex	CustomerSerialId:string, OrderSerialId:string, SubOrderSerialId:string, CreateDate:bigint, SourceFrom:bigint, SourceFromName:string, IsSuccess:bigint, SpecificErrorMessage:string, ex:object	编辑
20	sjmdffq	dbName:string, tableName:string, timelong:bigint, size:bigint, time:bigint, jobId:string, ext:object	编辑
21	skynetlogmonitor	data:string	编辑
23	hoteladditional	product_kind_code:string, product_code:string, is_flash:bigint, order_amount:string, settlement_type:bigint, time_consuming:bigint, dynamic_proportion:string	编辑
47	esapiindexinfo	clusterId:string, clusterName:string, health:string, index:string, pri:bigint, all:bigint, priRate:double, allRate:double, storeSize:double, time:date, type:string	编辑
49	esapinodeinfo	key:string, index:double, search:double, segmentsMemory:double, heapPercent:double, clusterId:string, clusterName:string, time:date, type:string, segmentsCount:double, host:string	编辑
50	esapithreadpool	key:string, active:double, new:double, time:date, type:string, clusterId:string, clusterName:string, host:string, rate:double	编辑

提前定义好字段

挑战-监控报警原始数据浪费

业务日志 esapinodeinfo

* 监控名称 esNodeIndexRate

监控描述 es节点写入信息

* 规则表达式 type eq rate Delete

+ 添加规则表达式

+ 添加标签限制

* 指标 avg index Delete

+ 添加指标

指标	频率	比对方式	阈值	标签	通知单位	#
avgindex	5	>	100	请选择	09494	

添加

提交

配置好监控报警策略

挑战-监控报警原始数据浪费-收益



100倍+ 存储量减少

Part4:未来展望

<http://www.itpub.net/>

未来展望

1. 寻找性价比更高的存储解决方案
2. 完成更多的基于日志的数据挖掘

<http://www.itpub.net/>

Thanks

<http://www.itpub.net/>

