

Elasticsearch Service

产品简介

产品文档



腾讯云

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产品简介

产品概述

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腾讯云 Elasticsearch Service (ES) 是基于开源搜索引擎 Elasticsearch 打造的高可用、可伸缩的云端全托管的 Elasticsearch 服务，包含 Kibana 及常用插件，并集成了安全、SQL、机器学习、告警、监控等高级特性 (X-Pack)。使用腾讯云 ES，您可以快速部署、轻松管理、按需扩展您的集群，简化复杂运维操作，快速构建日志分析、异常监控、网站搜索、企业搜索、BI 分析等各类业务。

腾讯云 ES 集成了腾讯云计算在计算、存储、安全等领域的领先技术优势，又保持了 Elasticsearch 本身的兼容与开放，拥有丰富的集群管理功能以及安全、弹性、高可用等特性，同时也集成了官方的高级商业特性 (X-Pack)，在开源的基础上，增加了权限管理、SQL、机器学习、告警等功能，可以帮助您简化集群部署、运营管理等基础运维工作，更加聚焦于业务本身。

通过腾讯云 ES，您可以快速构建海量数据存储搜索、实时日志分析等应用，例如网站搜索导航、企业级搜索、服务日志异常监控、点击流分析等。

主要组件

- Elasticsearch
分布式搜索引擎，可以对海量数据进行存储、全文检索、统计分析等，提供了 RESTful API 以及各类语言客户端，可以灵活地按照业务需求进行开发。
- Kibana
数据可视化工具，可以方便地对存入 Elasticsearch 集群的数据进行查询和分析。
- 高级特性 (X-Pack)
Elasticsearch 官方高级商业插件，提供了多项高级功能，包括数据权限管控，可以配置字段级别的权限控制；SQL、JDBC 的连接方式，可以很方便地同原有的业务系统进行集成；机器学习和告警，可以针对存入集群的数据，进行分析和波动趋势的学习，预测数据变化趋势，并在数据出现大的波动时进行告警。

产品功能

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用户可以将 CVM、TencentDB、容器服务等其他云产品的实时日志、业务的存量及增量业务数据，汇聚传输到 ES 集群，进行数据的分布式存储、查询分析。

数据采集与同步

- 用户通过 Elasticsearch 中的 Beats 功能，可以把数据传输到 Elasticsearch 中进行存储，也可以传输到 Logstash 中进行自定义转换和解析后，再传输到 Elasticsearch 中。
- Elasticsearch 提供了易用的 RESTful API，用户可以自行开发客户端，调用数据存储 API，存储数据到 Elasticsearch 集群中。
- ES 构建在 VPC 内，用户可以非常方便地使用各种数据同步插件，将已有云产品的数据，同步到 ES 集群中。

数据存储

- 腾讯云 ES 提供了多种规格的节点类型和高性能 SSD 磁盘，有效保障数据的读写性能。
- 支持弹性扩展到上百个节点，能达到 PB 级数据的存储，满足用户不同类型的业务场景。
- 支持故障节点探测及替换，保障集群高可用性。
- 具备全文检索功能。

数据查询分析可视化

- Elasticsearch 拥有全文检索、结构化搜索、数据过滤和指标统计等搜索功能，可应用于信息搜索和数据分析等多种场景。
- Elasticsearch 提供了简单易用的 RESTful API 以及各种语言的客户端，用户可以很方便地构建自己的搜索服务。
- 使用 Kibana，用户可以方便地在浏览器里对集群的数据进行搜索和统计分析。

产品性能

概述

最近更新时间：2021-11-12 09:59:46

本章节主要介绍通过 Elasticsearch 官方提供的 Benchmark rally 脚本，对不同规格的腾讯云 Elasticsearch Service (ES) 实例 (7.10.1版本) 进行压测的结果。

本章节提供以下几种规格的 ES 集群的压测结果：

- [4核16G 3节点集群性能测试](#)
- [8核32G 3节点集群性能测试](#)

同时提供了4核16G和8核32G的 ES 集群压测的比较结果，详情可参见 [4核16G 3节点与8核32G 3节点集群压测结果比较](#)。

4核16G 3节点集群性能测试

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本文提供4核16G SSD 200G 3个节点的腾讯云 Elasticsearch Service 集群的性能指标。

说明：

数据为官方提供的 [geonames](#)，包含11396503条地理位置信息，总大小接近3GB，包含了 text、long、geo 等类型数据，覆盖行列存。

对比4核16GB SSD 200G 3节点的腾讯云 ES 和社区版本的集群性能指标，腾讯云 ES 各方面性能均有一定优势。主要得益于腾讯云 ES 在底层存储模型优化（时序合并、冷分片持续合并）、查询执行计划优化（高效剪枝、缓存优化）、内置场景模板、自研 JDK、GC 参数调优等方面的优化，详见 [内核增强](#)。

geonames/7.10.1/4核16GB

说明	Metric	Unit	Task	腾讯云ES	社区版本	差异值 (社区版-ES)	差异i (差异社区)
写入总耗时	Cumulative indexing time of primary shards	min	-	16.3633	17.8173	1.454	8.16
GC 总次数、耗时统计	Total Young Gen GC time	s	-	6.26	68.454	62.194	90.8
	Total Young Gen GC count	次	-	892	4163	3271	78.5
	Total Old Gen GC time	s	-	0	0	0	-
	Total Old Gen GC count	次	-	0	0	0	-
存储大小	Store size	GB	-	2.51866	2.93883	0.42017	14.3
堆内存使用量	Heap used for segments	MB	-	0.803783	0.709301	-0.094482	-13.
	Heap used for doc values	MB	-	0.0284767	0.0218697	-0.006607	-30.
	Heap used for terms	MB	-	0.655075	0.562836	-0.092239	-16.
	Heap used for norms	MB	-	0.0732422	0.0765991	0.0033569	4.38
	Heap used for points	MB	-	0	0	0	-
	Heap used for stored fields	MB	-	0.0469894	0.0479965	0.0010071	2.10
segment 总数量	Segment count	次	-	6	97	91	93.8

说明	Metric	Unit	Task	腾讯云ES	社区版本	差异值 (社区版-ES)	差异 (差异社区)
写入吞吐、耗时统计	Min Throughput	docs/s	index-append	89331.9	80608.3	-8723.6	-10.
	Median Throughput	docs/s	index-append	90268.8	82576.8	-7692	-9.3
	Max Throughput	docs/s	index-append	90516.1	84030.5	-6485.6	-7.7
	50th percentile latency	ms	index-append	233.258	305.781	72.523	23.7
	90th percentile latency	ms	index-append	314.558	354.166	39.608	11.18
	99th percentile latency	ms	index-append	341.303	403.776	62.473	15.4
	100th percentile latency	ms	index-append	354.657	428.363	73.706	17.2
	50th percentile service time	ms	index-append	233.258	305.781	72.523	23.7
	90th percentile service time	ms	index-append	314.558	354.166	39.608	11.18
	99th percentile service time	ms	index-append	341.303	403.776	62.473	15.4
	100th percentile service time	ms	index-append	354.657	428.363	73.706	17.2
	error rate	%	index-append	0	0	0	-
index 指标统计	Min Throughput	ops/s	index-stats	90.04	90.05	0.01	0.01
	Median Throughput	ops/s	index-stats	90.07	90.07	0	0.00
	Max Throughput	ops/s	index-stats	90.14	90.13	-0.01	-0.0
	50th percentile latency	ms	index-stats	2.91003	3.07875	0.16872	5.48
	90th percentile latency	ms	index-stats	3.82882	4.27689	0.44807	10.4
	99th percentile latency	ms	index-stats	4.2378	4.75335	0.51555	10.8

说明	Metric	Unit	Task	腾讯云ES	社区版本	差异值 (社区版-ES)	差异 (差异社区)
	99.9th percentile latency	ms	index-stats	4.34459	9.2331	4.88851	52.9
	100th percentile latency	ms	index-stats	8.22393	17.3644	9.14047	52.6
	50th percentile service time	ms	index-stats	1.78268	2.17806	0.39538	18.1!
	90th percentile service time	ms	index-stats	2.07484	2.5508	0.47596	18.6
	99th percentile service time	ms	index-stats	2.43121	2.94067	0.50946	17.3
	99.9th percentile service time	ms	index-stats	3.09198	3.50368	0.4117	11.7!
	100th percentile service time	ms	index-stats	7.29974	15.5761	8.27636	53.1
	error rate	%	index-stats	0	0	0	-
node 指标统计	Min Throughput	ops/s	node-stats	90.06	90.05	-0.01	-0.0
	Median Throughput	ops/s	node-stats	90.09	90.09	0	0.00
	Max Throughput	ops/s	node-stats	90.34	90.33	-0.01	-0.0
	50th percentile latency	ms	node-stats	3.17223	3.60429	0.43206	11.9!
	90th percentile latency	ms	node-stats	3.70681	4.1719	0.46509	11.1!
	99th percentile latency	ms	node-stats	5.01334	5.7717	0.75836	13.1!
	99.9th percentile latency	ms	node-stats	6.75018	7.29828	0.5481	7.51
	100th percentile latency	ms	node-stats	7.98905	8.64352	0.65447	7.57

说明	Metric	Unit	Task	腾讯云ES	社区版本	差异值 (社区版-ES)	差异 (差异社区)
	50th percentile service time	ms	node-stats	2.43876	2.80255	0.36379	12.9
	90th percentile service time	ms	node-stats	2.78272	3.25325	0.47053	14.4
	99th percentile service time	ms	node-stats	4.12234	5.21353	1.09119	20.9
	99.9th percentile service time	ms	node-stats	6.35902	6.69629	0.33727	5.04
	100th percentile service time	ms	node-stats	7.4313	7.52479	0.09349	1.24
	error rate	%	node-stats	0	0	0	-
默认查询，所有文档 score 为1 (match_all)	Min Throughput	ops/s	default	50.03	50.03	0	0.00
	Median Throughput	ops/s	default	50.04	50.04	0	0.00
	Max Throughput	ops/s	default	50.08	50.07	-0.01	-0.0
	50th percentile latency	ms	default	3.89929	4.97851	1.07922	21.6
	90th percentile latency	ms	default	4.39236	5.47875	1.08639	19.8
	99th percentile latency	ms	default	4.78834	6.31232	1.52398	24.1
	99.9th percentile latency	ms	default	7.10486	46.1096	39.00474	84.5
	100th percentile latency	ms	default	8.75822	59.3054	50.54718	85.2
	50th percentile service time	ms	default	3.18269	4.13119	0.9485	22.9
	90th percentile service time	ms	default	3.49347	4.47708	0.98361	21.9

说明	Metric	Unit	Task	腾讯云ES	社区版本	差异值 (社区版-ES)	差异 (差异社区)
	99th percentile service time	ms	default	3.8746	5.30558	1.43098	26.9
	99.9th percentile service time	ms	default	6.68581	9.82652	3.14071	31.9
	100th percentile service time	ms	default	8.30396	58.1671	49.86314	85.7
	error rate	%	default	0	0	0	-
term 条件查询	Min Throughput	ops/s	term	100.05	100.04	-0.01	-0.0
	Median Throughput	ops/s	term	100.07	100.06	-0.01	-0.0
	Max Throughput	ops/s	term	100.14	100.12	-0.02	-0.0
	50th percentile latency	ms	term	3.17419	3.37056	0.19637	5.83
	90th percentile latency	ms	term	3.62229	3.8708	0.24851	6.42
	99th percentile latency	ms	term	4.03812	5.63819	1.60007	28.3
	99.9th percentile latency	ms	term	5.9753	7.94086	1.96556	24.7
	100th percentile latency	ms	term	8.03321	11.0892	3.05599	27.5
	50th percentile service time	ms	term	2.49755	2.59268	0.09513	3.67
	90th percentile service time	ms	term	2.71322	2.92963	0.21641	7.39
	99th percentile service time	ms	term	3.20673	4.4033	1.19657	27.1
	99.9th percentile service time	ms	term	5.17998	7.02644	1.84646	26.2

说明	Metric	Unit	Task	腾讯云ES	社区版本	差异值 (社区版-ES)	差异比 (差异社区版)
	100th percentile service time	ms	term	6.95227	10.7671	3.81483	35.4
	error rate	%	term	0	0	0	-
词组查询 (query)	Min Throughput	ops/s	phrase	110.05	110.05	0	0.00
	Median Throughput	ops/s	phrase	110.07	110.07	0	0.00
	Max Throughput	ops/s	phrase	110.12	110.11	-0.01	-0.0
	50th percentile latency	ms	phrase	3.09905	3.19024	0.09119	2.86
	90th percentile latency	ms	phrase	3.62549	3.74124	0.11575	3.09
	99th percentile latency	ms	phrase	4.55457	7.78506	3.23049	41.5
	99.9th percentile latency	ms	phrase	8.29519	20.249	11.95381	59.0
	100th percentile latency	ms	phrase	9.39771	23.2441	13.84639	59.5
	50th percentile service time	ms	phrase	2.38248	2.3894	0.00692	0.29
	90th percentile service time	ms	phrase	2.77084	2.75176	-0.01908	-0.6
	99th percentile service time	ms	phrase	3.75448	5.27172	1.51724	28.7
	99.9th percentile service time	ms	phrase	7.5974	19.2863	11.6889	60.6
	100th percentile service time	ms	phrase	8.98362	22.7147	13.73108	60.4
	error rate	%	phrase	0	0	0	-
	不带缓存的聚合查询 (aggregation)	Min Throughput	ops/s	country_agg_uncached	3.6	3.6	0

说明	Metric	Unit	Task	腾讯云ES	社区版本	差异值 (社区版-ES)	差异比 (差异社区版)
	Median Throughput	ops/s	country_agg_uncached	3.61	3.6	-0.01	-0.2
	Max Throughput	ops/s	country_agg_uncached	3.61	3.61	0	0.00
	50th percentile latency	ms	country_agg_uncached	157.466	179.894	22.428	12.4
	90th percentile latency	ms	country_agg_uncached	217.148	285.853	68.705	24.0
	99th percentile latency	ms	country_agg_uncached	233.185	294.468	61.283	20.8
	100th percentile latency	ms	country_agg_uncached	233.227	297.423	64.196	21.5
	50th percentile service time	ms	country_agg_uncached	156.197	174.585	18.388	10.5
	90th percentile service time	ms	country_agg_uncached	215.852	285.207	69.355	24.3
	99th percentile service time	ms	country_agg_uncached	232.177	287.223	55.046	19.1
	100th percentile service time	ms	country_agg_uncached	232.321	287.558	55.237	19.2
	error rate	%	country_agg_uncached	0	0	0	-
带缓存的聚合查询 (aggregation)	Min Throughput	ops/s	country_agg_cached	100.03	100.04	0.01	0.01
	Median Throughput	ops/s	country_agg_cached	100.05	100.05	0	0.00
	Max Throughput	ops/s	country_agg_cached	100.08	100.08	0	0.00
	50th percentile latency	ms	country_agg_cached	2.44457	2.43436	-0.01021	-0.4
	90th percentile latency	ms	country_agg_cached	2.97922	2.93955	-0.03967	-1.3
	99th percentile latency	ms	country_agg_cached	3.96393	3.89118	-0.07275	-1.8

说明	Metric	Unit	Task	腾讯云ES	社区版本	差异值 (社区版- ES)	差异值 (差异 社区)
	99.9th percentile latency	ms	country_agg_cached	5.3294	5.35195	0.02255	0.42
	100th percentile latency	ms	country_agg_cached	7.9529	5.4249	-2.528	-46.
	50th percentile service time	ms	country_agg_cached	1.71924	1.66542	-0.05382	-3.2
	90th percentile service time	ms	country_agg_cached	1.97892	1.84812	-0.1308	-7.0
	99th percentile service time	ms	country_agg_cached	2.22611	2.17057	-0.05554	-2.5
	99.9th percentile service time	ms	country_agg_cached	5.0967	4.25527	-0.84143	-19.
	100th percentile service time	ms	country_agg_cached	7.02246	4.95142	-2.07104	-41.
	error rate	%	country_agg_cached	0	0	0	-
分页拉取	Min Throughput	pages/s	scroll	20.04	20.05	0.01	0.05
	Median Throughput	pages/s	scroll	20.04	20.06	0.02	0.10
	Max Throughput	pages/s	scroll	20.05	20.07	0.02	0.10
	50th percentile latency	ms	scroll	576.675	598.124	21.449	3.59
	90th percentile latency	ms	scroll	585.156	620.373	35.217	5.68
	99th percentile latency	ms	scroll	598.95	646.07	47.12	7.29
	100th percentile latency	ms	scroll	602.009	646.523	44.514	6.89
	50th percentile service time	ms	scroll	575.118	596.707	21.589	3.62

说明	Metric	Unit	Task	腾讯云ES	社区版本	差异值 (社区版-ES)	差异 (差异社区)
	90th percentile service time	ms	scroll	583.906	618.824	34.918	5.64
	99th percentile service time	ms	scroll	597.482	644.695	47.213	7.32
	100th percentile service time	ms	scroll	600.578	644.847	44.269	6.87
	error rate	%	scroll	0	0	0	-
脚本查询 (使用 expression 脚本)	Min Throughput	ops/s	expression	2	2	0	0.00
	Median Throughput	ops/s	expression	2	2	0	0.00
	Max Throughput	ops/s	expression	2	2	0	0.00
	50th percentile latency	ms	expression	299.685	360.09	60.405	16.7
	90th percentile latency	ms	expression	416.613	491.791	75.178	15.2
	99th percentile latency	ms	expression	465.776	500.174	34.398	6.88
	100th percentile latency	ms	expression	468.083	500.209	32.126	6.42
	50th percentile service time	ms	expression	298.594	359.072	60.478	16.8
	90th percentile service time	ms	expression	415.045	489.912	74.867	15.2
	99th percentile service time	ms	expression	464.598	499.031	34.433	6.90
	100th percentile service time	ms	expression	467.106	499.083	31.977	6.41
	error rate	%	expression	0	0	0	-
脚本查询 (使用 painless 静态脚本, 不动态取字段值)	Min Throughput	ops/s	painless_static	1.5	1.5	0	0.00

说明	Metric	Unit	Task	腾讯云ES	社区版本	差异值 (社区版-ES)	差异 (差异社区)
	Median Throughput	ops/s	painless_static	1.5	1.5	0	0.00
	Max Throughput	ops/s	painless_static	1.5	1.5	0	0.00
	50th percentile latency	ms	painless_static	383.485	389.354	5.869	1.51'
	90th percentile latency	ms	painless_static	514.495	641.987	127.492	19.8
	99th percentile latency	ms	painless_static	561.342	644.179	82.837	12.8
	100th percentile latency	ms	painless_static	568.066	646.037	77.971	12.0
	50th percentile service time	ms	painless_static	382.158	388.178	6.02	1.55
	90th percentile service time	ms	painless_static	513.202	640.374	127.172	19.8
	99th percentile service time	ms	painless_static	560.61	642.894	82.284	12.8
	100th percentile service time	ms	painless_static	567.419	644.877	77.458	12.0
	error rate	%	painless_static	0	0	0	-
脚本查询（使用 painless 静态脚本，动态获取字段值）	Min Throughput	ops/s	painless_dynamic	1.5	1.5	0	0.00
	Median Throughput	ops/s	painless_dynamic	1.5	1.5	0	0.00
	Max Throughput	ops/s	painless_dynamic	1.5	1.5	0	0.00
	50th percentile latency	ms	painless_dynamic	377.278	393.005	15.727	4.00
	90th percentile latency	ms	painless_dynamic	517.496	633.853	116.357	18.3
	99th percentile latency	ms	painless_dynamic	576.697	653.933	77.236	11.8'

说明	Metric	Unit	Task	腾讯云ES	社区版本	差异值 (社区版-ES)	差异比 (差异社区)
	100th percentile latency	ms	painless_dynamic	580.017	660.309	80.292	12.11
	50th percentile service time	ms	painless_dynamic	376.339	391.545	15.206	3.88
	90th percentile service time	ms	painless_dynamic	516.407	632.713	116.306	18.3
	99th percentile service time	ms	painless_dynamic	575.714	652.838	77.124	11.8
	100th percentile service time	ms	painless_dynamic	579.642	659.102	79.46	12.0
	error rate	%	painless_dynamic	0	0	0	-
地理范围查询 (基于高斯衰减函数)	Min Throughput	ops/s	decay_geo_gauss_function_score	1	1	0	0.00
	Median Throughput	ops/s	decay_geo_gauss_function_score	1	1	0	0.00
	Max Throughput	ops/s	decay_geo_gauss_function_score	1	1	0	0.00
	50th percentile latency	ms	decay_geo_gauss_function_score	348.531	388.606	40.075	10.3
	90th percentile latency	ms	decay_geo_gauss_function_score	398.351	472.049	73.698	15.6
	99th percentile latency	ms	decay_geo_gauss_function_score	411.483	492.926	81.443	16.5
	100th percentile latency	ms	decay_geo_gauss_function_score	457.615	494.574	36.959	7.47
	50th percentile service time	ms	decay_geo_gauss_function_score	346.881	386.701	39.82	10.3
	90th percentile service time	ms	decay_geo_gauss_function_score	397.08	470.906	73.826	15.6
	99th percentile service time	ms	decay_geo_gauss_function_score	410.421	490.485	80.064	16.3

说明	Metric	Unit	Task	腾讯云ES	社区版本	差异值 (社区版- ES)	差异 (差异 社区)
	100th percentile service time	ms	decay_geo_gauss_function_score	455.704	492.584	36.88	7.49
	error rate	%	decay_geo_gauss_function_score	0	0	0	-
地理范围查询（基于高斯衰减函数，且脚本动态获取字段值）	Min Throughput	ops/s	decay_geo_gauss_script_score	1	1	0	0.00
	Median Throughput	ops/s	decay_geo_gauss_script_score	1	1	0	0.00
	Max Throughput	ops/s	decay_geo_gauss_script_score	1	1	0	0.00
	50th percentile latency	ms	decay_geo_gauss_script_score	368.275	430.786	62.511	14.5
	90th percentile latency	ms	decay_geo_gauss_script_score	414.905	539.778	124.873	23.1
	99th percentile latency	ms	decay_geo_gauss_script_score	468.888	543.645	74.757	13.7
	100th percentile latency	ms	decay_geo_gauss_script_score	477.25	546.901	69.651	12.7
	50th percentile service time	ms	decay_geo_gauss_script_score	366.945	429.517	62.572	14.5
	90th percentile service time	ms	decay_geo_gauss_script_score	413.609	538.256	124.647	23.1
	99th percentile service time	ms	decay_geo_gauss_script_score	467.627	542.623	74.996	13.8
	100th percentile service time	ms	decay_geo_gauss_script_score	475.367	545.409	70.042	12.8
	error rate	%	decay_geo_gauss_script_score	0	0	0	-
自定义评分函数查询（基于字段值定义函数）	Min Throughput	ops/s	field_value_function_score	1.5	1.5	0	0.00
	Median Throughput	ops/s	field_value_function_score	1.5	1.5	0	0.00
	Max Throughput	ops/s	field_value_function_score	1.51	1.51	0	0.00
	50th percentile latency	ms	field_value_function_score	139.661	162.157	22.496	13.8

说明	Metric	Unit	Task	腾讯云ES	社区版本	差异值 (社区版-ES)	差异比 (差异社区)
	90th percentile latency	ms	field_value_function_score	183.675	215.863	32.188	14.9
	99th percentile latency	ms	field_value_function_score	197.653	221.584	23.931	10.8
	100th percentile latency	ms	field_value_function_score	202.345	228.148	25.803	11.3
	50th percentile service time	ms	field_value_function_score	138.423	159.991	21.568	13.4
	90th percentile service time	ms	field_value_function_score	182.404	214.416	32.012	14.9
	99th percentile service time	ms	field_value_function_score	196.734	220.581	23.847	10.8
	100th percentile service time	ms	field_value_function_score	201.442	226.309	24.867	10.9
	error rate	%	field_value_function_score	0	0	0	-
自定义评分函数查询（通过脚本动态获取字段值计算评分）	Min Throughput	ops/s	field_value_script_score	1.5	1.5	0	0.00
	Median Throughput	ops/s	field_value_script_score	1.5	1.5	0	0.00
	Max Throughput	ops/s	field_value_script_score	1.51	1.51	0	0.00
	50th percentile latency	ms	field_value_script_score	188.952	189.786	0.834	0.44
	90th percentile latency	ms	field_value_script_score	264.095	313.248	49.153	15.6
	99th percentile latency	ms	field_value_script_score	271.153	326.875	55.722	17.0
	100th percentile latency	ms	field_value_script_score	271.901	338.193	66.292	19.6
	50th percentile service time	ms	field_value_script_score	187.218	187.56	0.342	0.18

说明	Metric	Unit	Task	腾讯云ES	社区版本	差异值 (社区版-ES)	差异 (差异社区)
	90th percentile service time	ms	field_value_script_score	263.207	311.552	48.345	15.5
	99th percentile service time	ms	field_value_script_score	269.578	325.759	56.181	17.2
	100th percentile service time	ms	field_value_script_score	270.138	336.648	66.51	19.7
	error rate	%	field_value_script_score	0	0	0	-
大量 terms 条件查询 (query)	Min Throughput	ops/s	large_terms	1.1	1.1	0	0.00
	Median Throughput	ops/s	large_terms	1.1	1.1	0	0.00
	Max Throughput	ops/s	large_terms	1.1	1.1	0	0.00
	50th percentile latency	ms	large_terms	265.007	835.444	570.437	68.2
	90th percentile latency	ms	large_terms	296.009	1134.63	838.621	73.9
	99th percentile latency	ms	large_terms	310.358	1323.69	1013.332	76.5
	100th percentile latency	ms	large_terms	311.049	1360.9	1049.851	77.1
	50th percentile service time	ms	large_terms	256.372	774.779	518.407	66.9
	90th percentile service time	ms	large_terms	287.851	1022.85	734.999	71.8
	99th percentile service time	ms	large_terms	301.827	1033.06	731.233	70.7
	100th percentile service time	ms	large_terms	302.251	1033.73	731.479	70.7
	error rate	%	large_terms	0	0	0	-
大量 terms 条件过滤查询 (query、filter)	Min Throughput	ops/s	large_filtered_terms	1.1	1.1	0	0.00

说明	Metric	Unit	Task	腾讯云ES	社区版本	差异值 (社区版-ES)	差异 (差异社区)
	Median Throughput	ops/s	large_filtered_terms	1.1	1.1	0	0.00
	Max Throughput	ops/s	large_filtered_terms	1.1	1.1	0	0.00
	50th percentile latency	ms	large_filtered_terms	268.135	778.729	510.594	65.5
	90th percentile latency	ms	large_filtered_terms	304.158	1007.17	703.012	69.8
	99th percentile latency	ms	large_filtered_terms	351.209	1107.21	756.001	68.2
	100th percentile latency	ms	large_filtered_terms	352.003	1137.25	785.247	69.0
	50th percentile service time	ms	large_filtered_terms	259.546	695.247	435.701	62.6
	90th percentile service time	ms	large_filtered_terms	295.721	997.742	702.021	70.3
	99th percentile service time	ms	large_filtered_terms	342.342	1023.46	681.118	66.5
	100th percentile service time	ms	large_filtered_terms	343.378	1026.96	683.582	66.5
	error rate	%	large_filtered_terms	0	0	0	-
大量条件取反查询 (query、must not)	Min Throughput	ops/s	large_prohibited_terms	1.1	1.1	0	0.00
	Median Throughput	ops/s	large_prohibited_terms	1.1	1.1	0	0.00
	Max Throughput	ops/s	large_prohibited_terms	1.1	1.1	0	0.00
	50th percentile latency	ms	large_prohibited_terms	270.041	828.126	558.085	67.3
	90th percentile latency	ms	large_prohibited_terms	310.351	1120.94	810.589	72.3
	99th percentile latency	ms	large_prohibited_terms	347.414	1294.23	946.816	73.1

说明	Metric	Unit	Task	腾讯云ES	社区版本	差异值 (社区版- ES)	差异比 (差异 社区)
	100th percentile latency	ms	large_prohibited_terms	349.499	1371	1021.501	74.5
	50th percentile service time	ms	large_prohibited_terms	261.734	728.821	467.087	64.0
	90th percentile service time	ms	large_prohibited_terms	302.279	1012.35	710.071	70.1
	99th percentile service time	ms	large_prohibited_terms	339.278	1032.58	693.302	67.1
	100th percentile service time	ms	large_prohibited_terms	340.817	1034.51	693.693	67.0
	error rate	%	large_prohibited_terms	0	0	0	-
降序排序查询	Min Throughput	ops/s	desc_sort_population	1.5	1.5	0	0.00
	Median Throughput	ops/s	desc_sort_population	1.51	1.51	0	0.00
	Max Throughput	ops/s	desc_sort_population	1.51	1.51	0	0.00
	50th percentile latency	ms	desc_sort_population	58.5828	65.9265	7.3437	11.14
	90th percentile latency	ms	desc_sort_population	77.9981	118.956	40.9579	34.4
	99th percentile latency	ms	desc_sort_population	80.8863	119.312	38.4257	32.2
	100th percentile latency	ms	desc_sort_population	83.1661	119.441	36.2749	30.3
	50th percentile service time	ms	desc_sort_population	57.1212	64.2672	7.146	11.12
	90th percentile service time	ms	desc_sort_population	76.7082	117.437	40.7288	34.6
	99th percentile service time	ms	desc_sort_population	79.2907	117.796	38.5053	32.6

说明	Metric	Unit	Task	腾讯云ES	社区版本	差异值 (社区版-ES)	差异 (差异社区)
	100th percentile service time	ms	desc_sort_population	81.6364	117.817	36.1806	30.7
	error rate	%	desc_sort_population	0	0	0	-
升序排序查询	Min Throughput	ops/s	asc_sort_population	1.5	1.5	0	0.00
	Median Throughput	ops/s	asc_sort_population	1.51	1.51	0	0.00
	Max Throughput	ops/s	asc_sort_population	1.51	1.51	0	0.00
	50th percentile latency	ms	asc_sort_population	62.4328	86.1481	23.7153	27.5
	90th percentile latency	ms	asc_sort_population	79.8441	123.886	44.0419	35.5
	99th percentile latency	ms	asc_sort_population	83.9411	124.563	40.6219	32.6
	100th percentile latency	ms	asc_sort_population	84.3925	125.311	40.9185	32.6
	50th percentile service time	ms	asc_sort_population	61.0637	84.976	23.9123	28.1
	90th percentile service time	ms	asc_sort_population	78.4101	122.197	43.7869	35.8
	99th percentile service time	ms	asc_sort_population	82.2652	123.488	41.2228	33.3
	100th percentile service time	ms	asc_sort_population	82.5616	124.006	41.4444	33.4
	error rate	%	asc_sort_population	0	0	0	-
	升序排序后 after 跳转查询	Min Throughput	ops/s	asc_sort_with_after_population	1.5	1.5	0
Median Throughput		ops/s	asc_sort_with_after_population	1.51	1.5	-0.01	-0.6
Max Throughput		ops/s	asc_sort_with_after_population	1.51	1.51	0	0.00
50th percentile latency		ms	asc_sort_with_after_population	88.1871	99.9363	11.7492	11.71

说明	Metric	Unit	Task	腾讯云ES	社区版本	差异值 (社区版-ES)	差异比 (差异社区版)
	90th percentile latency	ms	asc_sort_with_after_population	127.995	173.22	45.225	26.1
	99th percentile latency	ms	asc_sort_with_after_population	131.171	174.543	43.372	24.8
	100th percentile latency	ms	asc_sort_with_after_population	132.181	174.627	42.446	24.3
	50th percentile service time	ms	asc_sort_with_after_population	87.132	98.2278	11.0958	11.34
	90th percentile service time	ms	asc_sort_with_after_population	126.818	171.284	44.466	25.9
	99th percentile service time	ms	asc_sort_with_after_population	129.453	171.658	42.205	24.5
	100th percentile service time	ms	asc_sort_with_after_population	130.452	171.671	41.219	24.0
	error rate	%	asc_sort_with_after_population	0	0	0	-
高基字段降序排序查询（基于 DistanceFeatureQuery 快速取 topK）	Min Throughput	ops/s	desc_sort_geonameid	6.02	6.02	0	0.00
	Median Throughput	ops/s	desc_sort_geonameid	6.02	6.02	0	0.00
	Max Throughput	ops/s	desc_sort_geonameid	6.03	6.03	0	0.00
	50th percentile latency	ms	desc_sort_geonameid	7.4659	7.55118	0.08528	1.13%
	90th percentile latency	ms	desc_sort_geonameid	8.26766	9.07559	0.80793	8.90%
	99th percentile latency	ms	desc_sort_geonameid	8.72369	9.69573	0.97204	10.0%
	100th percentile latency	ms	desc_sort_geonameid	8.79956	10.4637	1.66414	15.9%
	50th percentile service time	ms	desc_sort_geonameid	6.59986	6.5233	-0.07656	-1.1%

说明	Metric	Unit	Task	腾讯云ES	社区版本	差异值 (社区版- ES)	差异 (差异 社区)
	90th percentile service time	ms	desc_sort_geonameid	7.24539	7.85882	0.61343	7.81
	99th percentile service time	ms	desc_sort_geonameid	7.57925	8.40503	0.82578	9.82
	100th percentile service time	ms	desc_sort_geonameid	7.64471	9.40507	1.76036	18.7
	error rate	%	desc_sort_geonameid	0	0	0	-
高基字段降序排序 after 跳转查询	Min Throughput	ops/s	desc_sort_with_after_geonameid	6.01	6	-0.01	-0.1
	Median Throughput	ops/s	desc_sort_with_after_geonameid	6.01	6.01	0	0.00
	Max Throughput	ops/s	desc_sort_with_after_geonameid	6.02	6.01	-0.01	-0.1
	50th percentile latency	ms	desc_sort_with_after_geonameid	89.4587	107.925	18.4663	17.1
	90th percentile latency	ms	desc_sort_with_after_geonameid	119.777	154.588	34.811	22.5
	99th percentile latency	ms	desc_sort_with_after_geonameid	123.271	155.65	32.379	20.8
	100th percentile latency	ms	desc_sort_with_after_geonameid	123.628	156.32	32.692	20.9
	50th percentile service time	ms	desc_sort_with_after_geonameid	88.512	107.08	18.568	17.3
	90th percentile service time	ms	desc_sort_with_after_geonameid	118.72	153.345	34.625	22.5
	99th percentile service time	ms	desc_sort_with_after_geonameid	122.79	153.867	31.077	20.2
	100th percentile service time	ms	desc_sort_with_after_geonameid	122.791	154.586	31.795	20.5
	error rate	%	desc_sort_with_after_geonameid	0	0	0	-
高基字段升序排序查询 (基于	Min Throughput	ops/s	asc_sort_geonameid	6.02	6.02	0	0.00

DistanceFeatureQuery 快速取 topK) 说明	Metric	Unit	Task	腾讯云ES	社区版本	差异值 (社区版- ES)	差异 (差异 社区)
	Median Throughput	ops/s	asc_sort_geonameid	6.02	6.02	0	0.00
	Max Throughput	ops/s	asc_sort_geonameid	6.03	6.03	0	0.00
	50th percentile latency	ms	asc_sort_geonameid	5.80593	5.78184	-0.02409	-0.4
	90th percentile latency	ms	asc_sort_geonameid	6.55438	6.60544	0.05106	0.77
	99th percentile latency	ms	asc_sort_geonameid	7.36432	8.35744	0.99312	11.8
	100th percentile latency	ms	asc_sort_geonameid	7.49672	30.8939	23.39718	75.7
	50th percentile service time	ms	asc_sort_geonameid	4.91916	4.95407	0.03491	0.70
	90th percentile service time	ms	asc_sort_geonameid	5.61126	5.2657	-0.34556	-6.5
	99th percentile service time	ms	asc_sort_geonameid	6.12285	7.42835	1.3055	17.5
	100th percentile service time	ms	asc_sort_geonameid	6.51222	29.8436	23.33138	78.1
	error rate	%	asc_sort_geonameid	0	0	0	-
高基字段升序排序 after 跳转查询	Min Throughput	ops/s	asc_sort_with_after_geonameid	6.01	6	-0.01	-0.1
	Median Throughput	ops/s	asc_sort_with_after_geonameid	6.01	6.01	0	0.00
	Max Throughput	ops/s	asc_sort_with_after_geonameid	6.01	6.02	0.01	0.17
	50th percentile latency	ms	asc_sort_with_after_geonameid	70.994	102.943	31.949	31.0
	90th percentile latency	ms	asc_sort_with_after_geonameid	104.817	137.463	32.646	23.7
	99th percentile latency	ms	asc_sort_with_after_geonameid	108.797	139.088	30.291	21.7

说明	Metric	Unit	Task	腾讯云ES	社区版本	差异值 (社区版- ES)	差异 (差异 社区)
	100th percentile latency	ms	asc_sort_with_after_geonameid	108.929	140.114	31.185	22.2
	50th percentile service time	ms	asc_sort_with_after_geonameid	69.7056	101.661	31.9554	31.4
	90th percentile service time	ms	asc_sort_with_after_geonameid	103.875	136.324	32.449	23.8
	99th percentile service time	ms	asc_sort_with_after_geonameid	107.828	138.331	30.503	22.0
	100th percentile service time	ms	asc_sort_with_after_geonameid	108.539	139.012	30.473	21.9
	error rate	%	asc_sort_with_after_geonameid	0	0	0	-

8核32G 3节点集群性能测试

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本文提供8核32G SSD 200G 3个节点的腾讯云 Elasticsearch Service 集群的性能指标。

说明：

数据为官方提供的 [geonames](#)，包含11396503条地理位置信息，总大小接近3GB，包含了 text、long、geo 等类型数据，覆盖行列存。

对比8核32GB SSD 200G 3节点的腾讯云 ES 和社区版本的集群性能指标，腾讯云 ES 各方面性能均有一定优势。主要得益于腾讯云 ES 在底层存储模型优化（时序合并、冷分片持续合并）、查询执行计划优化（高效剪枝、缓存优化）、内置场景模板、自研 JDK、GC 参数调优等方面的优化，详见 [内核增强](#)。

geonames/7.10.1/8核32GB

说明	Metric	Unit	Task	腾讯云ES	社区版本	差异值 (社区版-ES)	差异 (差异社区)
写入总耗时	Cumulative indexing time of primary shards	min	-	14.2567	15.4834	1.2267	7.92
GC 总次数、耗时统计	Total Young Gen GC time	s	-	3.544	17.73	14.186	80.0
	Total Young Gen GC count	次	-	447	1084	637	58.7
	Total Old Gen GC time	s	-	0	0	0	-
	Total Old Gen GC count	次	-	0	0	0	-
存储大小	Store size	GB	-	2.59725	3.07604	0.47879	15.5
堆内存使用量	Heap used for segments	MB	-	0.534325	0.766575	0.23225	30.3
	Heap used for doc values	MB	-	0.0507355	0.0315514	-0.0191841	-60
	Heap used for terms	MB	-	0.370026	0.601349	0.231323	38.4
	Heap used for norms	MB	-	0.0396729	0.0817871	0.0421142	51.4
	Heap used for points	MB	-	0	0	0	-
	Heap used for stored fields	MB	-	0.0119553	0.0518875	0.0399322	76.9
segment 总数量	Segment count	次	-	7	105	98	93.3

说明	Metric	Unit	Task	腾讯云ES	社区版本	差异值 (社区版-ES)	差异 (差异社区)
写入吞吐、耗时统计	Min Throughput	docs/s	index-append	153730	132776	-20954	-15.
	Median Throughput	docs/s	index-append	159765	142851	-16914	-11.
	Max Throughput	docs/s	index-append	162791	148669	-14122	-9.5
	50th percentile latency	ms	index-append	130.877	151.656	20.779	13.7
	90th percentile latency	ms	index-append	162.969	187.779	24.81	13.2
	99th percentile latency	ms	index-append	181.428	240.11	58.682	24.4
	100th percentile latency	ms	index-append	225.98	285.137	59.157	20.7
	50th percentile service time	ms	index-append	130.877	151.656	20.779	13.7
	90th percentile service time	ms	index-append	162.969	187.779	24.81	13.2
	99th percentile service time	ms	index-append	181.428	240.11	58.682	24.4
	100th percentile service time	ms	index-append	225.98	285.137	59.157	20.7
	error rate	%	index-append	0	0	0	-
	index 指标统计	Min Throughput	ops/s	index-stats	90.05	90.05	0
Median Throughput		ops/s	index-stats	90.06	90.07	0.01	0.01
Max Throughput		ops/s	index-stats	90.12	90.13	0.01	0.01
50th percentile latency		ms	index-stats	2.76736	2.65897	-0.10839	-4.0
90th percentile latency		ms	index-stats	3.58235	3.48937	-0.09298	-2.6
99th percentile latency		ms	index-stats	3.95798	3.89304	-0.06494	-1.6

说明	Metric	Unit	Task	腾讯云ES	社区版本	差异值 (社区版-ES)	差异 (差异社区)
	99.9th percentile latency	ms	index-stats	4.39377	9.07619	4.68242	51.5
	100th percentile latency	ms	index-stats	9.00375	18.123	9.11925	50.3
	50th percentile service time	ms	index-stats	1.57744	1.45244	-0.125	-8.6
	90th percentile service time	ms	index-stats	1.8317	1.66173	-0.16997	-10.0
	99th percentile service time	ms	index-stats	2.0752	1.94615	-0.12905	-6.6
	99.9th percentile service time	ms	index-stats	2.24891	2.64752	0.39861	15.0
	100th percentile service time	ms	index-stats	2.31078	16.5015	14.19072	86.0
	error rate	%	index-stats	0	0	0	-
node 指标统计	Min Throughput	ops/s	node-stats	90.06	90.06	0	0.00
	Median Throughput	ops/s	node-stats	90.12	90.12	0	0.00
	Max Throughput	ops/s	node-stats	90.36	90.39	0.03	0.03
	50th percentile latency	ms	node-stats	2.9754	2.93862	-0.03678	-1.2
	90th percentile latency	ms	node-stats	4.07929	4.0283	-0.05099	-1.2
	99th percentile latency	ms	node-stats	5.0754	4.78946	-0.28594	-5.9
	99.9th percentile latency	ms	node-stats	6.53613	17.0702	10.53407	61.7
	100th percentile latency	ms	node-stats	6.93454	24.7832	17.84866	72.0

说明	Metric	Unit	Task	腾讯云ES	社区版本	差异值 (社区版-ES)	差异 (差异社区)
	50th percentile service time	ms	node-stats	2.23841	2.17713	-0.06128	-2.8
	90th percentile service time	ms	node-stats	2.65367	2.62466	-0.02901	-1.1
	99th percentile service time	ms	node-stats	3.92073	3.93043	0.0097	0.25
	99.9th percentile service time	ms	node-stats	4.92842	4.48172	-0.4467	-9.9
	100th percentile service time	ms	node-stats	5.92757	23.7859	17.85833	75.0
	error rate	%	node-stats	0	0	0	-
默认查询，所有文档 score 为1 (match_all)	Min Throughput	ops/s	default	50.03	50.03	0	0.00
	Median Throughput	ops/s	default	50.04	50.04	0	0.00
	Max Throughput	ops/s	default	50.08	50.08	0	0.00
	50th percentile latency	ms	default	3.53894	3.40291	-0.13603	-4.0
	90th percentile latency	ms	default	4.11403	4.57279	0.45876	10.0
	99th percentile latency	ms	default	4.92737	5.37426	0.44689	8.32
	99.9th percentile latency	ms	default	5.74037	25.897	20.15663	77.8
	100th percentile latency	ms	default	7.32557	27.2085	19.88293	73.0
	50th percentile service time	ms	default	2.7831	2.67459	-0.10851	-4.0
	90th percentile service time	ms	default	3.17322	2.97996	-0.19326	-6.4

说明	Metric	Unit	Task	腾讯云ES	社区版本	差异值 (社区版-ES)	差异 (差异社区)
	99th percentile service time	ms	default	3.77477	3.38794	-0.38683	-11.
	99.9th percentile service time	ms	default	4.19186	25.1729	20.98104	83.3
	100th percentile service time	ms	default	6.58243	26.1698	19.58737	74.8
	error rate	%	default	0	0	0	-
term 条件查询	Min Throughput	ops/s	term	99.66	100.05	0.39	0.39
	Median Throughput	ops/s	term	100.07	100.08	0.01	0.01
	Max Throughput	ops/s	term	100.11	100.15	0.04	0.04
	50th percentile latency	ms	term	2.83987	2.72933	-0.11054	-4.0
	90th percentile latency	ms	term	3.32569	3.16805	-0.15764	-4.9
	99th percentile latency	ms	term	3.96055	3.66753	-0.29302	-7.9
	99.9th percentile latency	ms	term	4.33961	9.62272	5.28311	54.9
	100th percentile latency	ms	term	5.70421	16.4559	10.75169	65.3
	50th percentile service time	ms	term	2.08935	2.00258	-0.08677	-4.3
	90th percentile service time	ms	term	2.53284	2.24384	-0.289	-12.
	99th percentile service time	ms	term	2.99484	2.64135	-0.35349	-13.
	99.9th percentile service time	ms	term	3.37709	6.10442	2.72733	44.6

说明	Metric	Unit	Task	腾讯云ES	社区版本	差异值 (社区版-ES)	差异 (差异社区)
	100th percentile service time	ms	term	5.24029	15.8044	10.56411	66.8
	error rate	%	term	0	0	0	-
词组查询 (query)	Min Throughput	ops/s	phrase	110.04	110.06	0.02	0.02
	Median Throughput	ops/s	phrase	110.08	110.07	-0.01	-0.0
	Max Throughput	ops/s	phrase	110.11	110.11	0	0.00
	50th percentile latency	ms	phrase	2.74088	2.89197	0.15109	5.22
	90th percentile latency	ms	phrase	3.30207	3.39345	0.09138	2.69
	99th percentile latency	ms	phrase	4.8127	8.22389	3.41119	41.4
	99.9th percentile latency	ms	phrase	5.57204	25.9978	20.42576	78.5
	100th percentile latency	ms	phrase	6.54587	27.9116	21.36573	76.5
	50th percentile service time	ms	phrase	1.98839	2.18937	0.20098	9.18
	90th percentile service time	ms	phrase	2.41365	2.51158	0.09793	3.90
	99th percentile service time	ms	phrase	4.00121	3.24254	-0.75867	-23.
	99.9th percentile service time	ms	phrase	4.70793	25.7224	21.01447	81.7
	100th percentile service time	ms	phrase	5.67829	27.4831	21.80481	79.3
	error rate	%	phrase	0	0	0	-
	不带缓存的聚合查询 (aggregation)	Min Throughput	ops/s	country_agg_uncached	3.6	3.6	0

说明	Metric	Unit	Task	腾讯云ES	社区版本	差异值 (社区版-ES)	差异 (差异社区)
	Median Throughput	ops/s	country_agg_uncached	3.61	3.61	0	0.00
	Max Throughput	ops/s	country_agg_uncached	3.61	3.61	0	0.00
	50th percentile latency	ms	country_agg_uncached	130.314	162.61	32.296	19.8
	90th percentile latency	ms	country_agg_uncached	147.567	176.4	28.833	16.3
	99th percentile latency	ms	country_agg_uncached	165.174	184.368	19.194	10.4
	100th percentile latency	ms	country_agg_uncached	174.015	269.972	95.957	35.5
	50th percentile service time	ms	country_agg_uncached	129.186	161.723	32.537	20.1
	90th percentile service time	ms	country_agg_uncached	146.921	175.819	28.898	16.4
	99th percentile service time	ms	country_agg_uncached	164.579	183.7	19.121	10.4
	100th percentile service time	ms	country_agg_uncached	172.827	269.339	96.512	35.8
	error rate	%	country_agg_uncached	0	0	0	-
带缓存的聚合查询 (aggregation)	Min Throughput	ops/s	country_agg_cached	100.04	100.03	-0.01	-0.0
	Median Throughput	ops/s	country_agg_cached	100.05	100.06	0.01	0.01
	Max Throughput	ops/s	country_agg_cached	100.08	100.08	0	0.00
	50th percentile latency	ms	country_agg_cached	2.29531	2.10251	-0.1928	-9.1
	90th percentile latency	ms	country_agg_cached	3.57418	3.49217	-0.08201	-2.3
	99th percentile latency	ms	country_agg_cached	3.91685	3.74707	-0.16978	-4.5

说明	Metric	Unit	Task	腾讯云ES	社区版本	差异值 (社区版-ES)	差异 (差异社区)
	99.9th percentile latency	ms	country_agg_cached	4.19749	4.05757	-0.13992	-3.4
	100th percentile latency	ms	country_agg_cached	4.51842	4.63039	0.11197	2.42
	50th percentile service time	ms	country_agg_cached	1.57861	1.40612	-0.17249	-12.
	90th percentile service time	ms	country_agg_cached	1.89111	1.58866	-0.30245	-19.
	99th percentile service time	ms	country_agg_cached	2.19488	1.74583	-0.44905	-25.
	99.9th percentile service time	ms	country_agg_cached	3.42563	3.46564	0.04001	1.15
	100th percentile service time	ms	country_agg_cached	4.28971	3.97654	-0.31317	-7.8
	error rate	%	country_agg_cached	0	0	0	-
分页拉取	Min Throughput	pages/s	scroll	20.04	20.04	0	0.00
	Median Throughput	pages/s	scroll	20.05	20.04	-0.01	-0.0
	Max Throughput	pages/s	scroll	20.06	20.06	0	0.00
	50th percentile latency	ms	scroll	538.421	556.145	17.724	3.19
	90th percentile latency	ms	scroll	543.566	573.903	30.337	5.29
	99th percentile latency	ms	scroll	582.263	585.602	3.339	0.57
	100th percentile latency	ms	scroll	584.75	587.091	2.341	0.40
	50th percentile service time	ms	scroll	537.068	554.325	17.257	3.11

说明	Metric	Unit	Task	腾讯云ES	社区版本	差异值 (社区版-ES)	差异 (差异社区)
	90th percentile service time	ms	scroll	542.428	572.308	29.88	5.22
	99th percentile service time	ms	scroll	580.372	583.701	3.329	0.57
	100th percentile service time	ms	scroll	583.612	584.764	1.152	0.20
	error rate	%	scroll	0	0	0	-
脚本查询 (使用 expression 脚本)	Min Throughput	ops/s	expression	2	2	0	0.00
	Median Throughput	ops/s	expression	2	2	0	0.00
	Max Throughput	ops/s	expression	2	2	0	0.00
	50th percentile latency	ms	expression	265.631	277.403	11.772	4.24
	90th percentile latency	ms	expression	287.121	299.5	12.379	4.13
	99th percentile latency	ms	expression	311.788	434.462	122.674	28.2
	100th percentile latency	ms	expression	391.745	446.275	54.53	12.2
	50th percentile service time	ms	expression	264.462	276.536	12.074	4.37
	90th percentile service time	ms	expression	285.113	298.434	13.321	4.46
	99th percentile service time	ms	expression	310.991	434.014	123.023	28.3
	100th percentile service time	ms	expression	390.33	445.661	55.331	12.4
	error rate	%	expression	0	0	0	-
脚本查询 (使用 painless 静态脚本, 不动态取字段值)	Min Throughput	ops/s	painless_static	1.5	1.5	0	0.00

说明	Metric	Unit	Task	腾讯云ES	社区版本	差异值 (社区版-ES)	差异 (差异社区)
	Median Throughput	ops/s	painless_static	1.5	1.5	0	0.00
	Max Throughput	ops/s	painless_static	1.5	1.5	0	0.00
	50th percentile latency	ms	painless_static	337.96	364.636	26.676	7.32
	90th percentile latency	ms	painless_static	358.738	383.504	24.766	6.46
	99th percentile latency	ms	painless_static	375.017	459.529	84.512	18.3
	100th percentile latency	ms	painless_static	395.417	557.708	162.291	29.1
	50th percentile service time	ms	painless_static	337.111	363.478	26.367	7.25
	90th percentile service time	ms	painless_static	357.771	382.45	24.679	6.45
	99th percentile service time	ms	painless_static	374.121	458.343	84.222	18.3
	100th percentile service time	ms	painless_static	394.632	556.401	161.769	29.0
	error rate	%	painless_static	0	0	0	-
脚本查询（使用 painless 静态脚本，动态获取字段值）	Min Throughput	ops/s	painless_dynamic	1.5	1.5	0	0.00
	Median Throughput	ops/s	painless_dynamic	1.5	1.5	0	0.00
	Max Throughput	ops/s	painless_dynamic	1.5	1.5	0	0.00
	50th percentile latency	ms	painless_dynamic	334.684	365.354	30.67	8.39
	90th percentile latency	ms	painless_dynamic	354.406	390.406	36	9.22
	99th percentile latency	ms	painless_dynamic	377.214	552.417	175.203	31.7

说明	Metric	Unit	Task	腾讯云ES	社区版本	差异值 (社区版-ES)	差异 (差异社区)
	100th percentile latency	ms	painless_dynamic	381.276	554.12	172.844	31.1
	50th percentile service time	ms	painless_dynamic	333.654	364.353	30.699	8.43
	90th percentile service time	ms	painless_dynamic	353.246	389.419	36.173	9.29
	99th percentile service time	ms	painless_dynamic	375.956	551.619	175.663	31.8
	100th percentile service time	ms	painless_dynamic	379.75	553.208	173.458	31.3
	error rate	%	painless_dynamic	0	0	0	-
地理范围查询 (基于高斯衰减函数)	Min Throughput	ops/s	decay_geo_gauss_function_score	1	1	0	0.00
	Median Throughput	ops/s	decay_geo_gauss_function_score	1	1	0	0.00
	Max Throughput	ops/s	decay_geo_gauss_function_score	1	1	0	0.00
	50th percentile latency	ms	decay_geo_gauss_function_score	327.972	327.664	-0.308	-0.0
	90th percentile latency	ms	decay_geo_gauss_function_score	336.979	344.367	7.388	2.15
	99th percentile latency	ms	decay_geo_gauss_function_score	343.562	417.386	73.824	17.6
	100th percentile latency	ms	decay_geo_gauss_function_score	344.135	420.996	76.861	18.2
	50th percentile service time	ms	decay_geo_gauss_function_score	326.554	326.503	-0.051	-0.0
	90th percentile service time	ms	decay_geo_gauss_function_score	336.053	343.32	7.267	2.12
	99th percentile service time	ms	decay_geo_gauss_function_score	342.151	416.72	74.569	17.8

说明	Metric	Unit	Task	腾讯云ES	社区版本	差异值 (社区版-ES)	差异 (差异社区)
	100th percentile service time	ms	decay_geo_gauss_function_score	342.843	419.488	76.645	18.2
	error rate	%	decay_geo_gauss_function_score	0	0	0	-
地理范围查询（基于高斯衰减函数，且脚本动态获取字段值）	Min Throughput	ops/s	decay_geo_gauss_script_score	1	1	0	0.00
	Median Throughput	ops/s	decay_geo_gauss_script_score	1	1	0	0.00
	Max Throughput	ops/s	decay_geo_gauss_script_score	1	1	0	0.00
	50th percentile latency	ms	decay_geo_gauss_script_score	341.152	344.421	3.269	0.95
	90th percentile latency	ms	decay_geo_gauss_script_score	349.94	371.575	21.635	5.82
	99th percentile latency	ms	decay_geo_gauss_script_score	354.76	420.658	65.898	15.6
	100th percentile latency	ms	decay_geo_gauss_script_score	364.169	438.541	74.372	16.9
	50th percentile service time	ms	decay_geo_gauss_script_score	339.967	342.961	2.994	0.87
	90th percentile service time	ms	decay_geo_gauss_script_score	348.493	370.146	21.653	5.85
	99th percentile service time	ms	decay_geo_gauss_script_score	353.559	418.767	65.208	15.5
	100th percentile service time	ms	decay_geo_gauss_script_score	362.748	437.195	74.447	17.0
	error rate	%	decay_geo_gauss_script_score	0	0	0	-
自定义评分函数查询（基于字段值定义函数）	Min Throughput	ops/s	field_value_function_score	1.5	1.5	0	0.00
	Median Throughput	ops/s	field_value_function_score	1.5	1.5	0	0.00
	Max Throughput	ops/s	field_value_function_score	1.51	1.51	0	0.00
	50th percentile latency	ms	field_value_function_score	120.538	129.323	8.785	6.79

说明	Metric	Unit	Task	腾讯云ES	社区版本	差异值 (社区版-ES)	差异 (差异社区)
	90th percentile latency	ms	field_value_function_score	137.702	152.985	15.283	9.99
	99th percentile latency	ms	field_value_function_score	147.851	185.772	37.921	20.4
	100th percentile latency	ms	field_value_function_score	169.961	186.405	16.444	8.82
	50th percentile service time	ms	field_value_function_score	119.159	128.146	8.987	7.01
	90th percentile service time	ms	field_value_function_score	136.338	151.555	15.217	10.0
	99th percentile service time	ms	field_value_function_score	146.981	184.934	37.953	20.5
	100th percentile service time	ms	field_value_function_score	168.964	185.269	16.305	8.80
	error rate	%	field_value_function_score	0	0	0	-
自定义评分函数查询（通过脚本动态获取字段值计算评分）	Min Throughput	ops/s	field_value_script_score	1.5	1.5	0	0.00
	Median Throughput	ops/s	field_value_script_score	1.5	1.5	0	0.00
	Max Throughput	ops/s	field_value_script_score	1.51	1.51	0	0.00
	50th percentile latency	ms	field_value_script_score	168.069	171.907	3.838	2.23
	90th percentile latency	ms	field_value_script_score	178.933	184.467	5.534	3.00
	99th percentile latency	ms	field_value_script_score	196.982	200.137	3.155	1.58
	100th percentile latency	ms	field_value_script_score	198.722	206.461	7.739	3.75
	50th percentile service time	ms	field_value_script_score	166.827	170.653	3.826	2.24

说明	Metric	Unit	Task	腾讯云ES	社区版本	差异值 (社区版-ES)	差异 (差异社区)
	90th percentile service time	ms	field_value_script_score	177.869	183.324	5.455	2.98
	99th percentile service time	ms	field_value_script_score	195.586	199.107	3.521	1.77
	100th percentile service time	ms	field_value_script_score	197.054	205.323	8.269	4.03
	error rate	%	field_value_script_score	0	0	0	-
大量 terms 条件查询 (query)	Min Throughput	ops/s	large_terms	1.1	1.1	0	0.00
	Median Throughput	ops/s	large_terms	1.1	1.1	0	0.00
	Max Throughput	ops/s	large_terms	1.1	1.1	0	0.00
	50th percentile latency	ms	large_terms	241.322	597.464	356.142	59.6
	90th percentile latency	ms	large_terms	252.637	600.941	348.304	57.9
	99th percentile latency	ms	large_terms	265.807	749.895	484.088	64.5
	100th percentile latency	ms	large_terms	272.611	751.444	478.833	63.7
	50th percentile service time	ms	large_terms	233.129	589.829	356.7	60.4
	90th percentile service time	ms	large_terms	244.494	593.562	349.068	58.8
	99th percentile service time	ms	large_terms	258.894	742.68	483.786	65.1
	100th percentile service time	ms	large_terms	264.352	743.9	479.548	64.4
	error rate	%	large_terms	0	0	0	-
大量 terms 条件过滤查询 (query、filter)	Min Throughput	ops/s	large_filtered_terms	1.1	1.1	0	0.00

说明	Metric	Unit	Task	腾讯云ES	社区版本	差异值 (社区版-ES)	差异 (差异社区)
	Median Throughput	ops/s	large_filtered_terms	1.1	1.1	0	0.00
	Max Throughput	ops/s	large_filtered_terms	1.1	1.1	0	0.00
	50th percentile latency	ms	large_filtered_terms	233.192	596.04	362.848	60.8
	90th percentile latency	ms	large_filtered_terms	241.102	604.321	363.219	60.1
	99th percentile latency	ms	large_filtered_terms	251.835	717.036	465.201	64.8
	100th percentile latency	ms	large_filtered_terms	260.27	749.665	489.395	65.2
	50th percentile service time	ms	large_filtered_terms	225.052	588.28	363.228	61.7
	90th percentile service time	ms	large_filtered_terms	233.16	595.415	362.255	60.8
	99th percentile service time	ms	large_filtered_terms	243.603	708.968	465.365	65.6
	100th percentile service time	ms	large_filtered_terms	252.129	741.922	489.793	66.0
	error rate	%	large_filtered_terms	0	0	0	-
大量条件取反查询 (query、must not)	Min Throughput	ops/s	large_prohibited_terms	1.1	1.1	0	0.00
	Median Throughput	ops/s	large_prohibited_terms	1.1	1.1	0	0.00
	Max Throughput	ops/s	large_prohibited_terms	1.1	1.1	0	0.00
	50th percentile latency	ms	large_prohibited_terms	235.179	610.41	375.231	61.4
	90th percentile latency	ms	large_prohibited_terms	241.076	631.544	390.468	61.8
	99th percentile latency	ms	large_prohibited_terms	255.983	774.92	518.937	66.9

说明	Metric	Unit	Task	腾讯云ES	社区版本	差异值 (社区版-ES)	差异 (差异社区)
	100th percentile latency	ms	large_prohibited_terms	259.046	779.168	520.122	66.7
	50th percentile service time	ms	large_prohibited_terms	227.487	603.342	375.855	62.3
	90th percentile service time	ms	large_prohibited_terms	233.792	624.55	390.758	62.5
	99th percentile service time	ms	large_prohibited_terms	248.53	767.511	518.981	67.6
	100th percentile service time	ms	large_prohibited_terms	251.083	771.655	520.572	67.4
	error rate	%	large_prohibited_terms	0	0	0	-
降序排序查询	Min Throughput	ops/s	desc_sort_population	1.5	1.5	0	0.00
	Median Throughput	ops/s	desc_sort_population	1.51	1.51	0	0.00
	Max Throughput	ops/s	desc_sort_population	1.51	1.51	0	0.00
	50th percentile latency	ms	desc_sort_population	48.387	56.6622	8.2752	14.6
	90th percentile latency	ms	desc_sort_population	63.073	94.9756	31.9026	33.5
	99th percentile latency	ms	desc_sort_population	71.7498	97.2611	25.5113	26.2
	100th percentile latency	ms	desc_sort_population	83.3593	97.7817	14.4224	14.7
	50th percentile service time	ms	desc_sort_population	47.0436	55.1461	8.1025	14.6
	90th percentile service time	ms	desc_sort_population	61.3731	93.9102	32.5371	34.6
	99th percentile service time	ms	desc_sort_population	70.4811	95.6134	25.1323	26.2

说明	Metric	Unit	Task	腾讯云ES	社区版本	差异值 (社区版-ES)	差异 (差异社区)
	100th percentile service time	ms	desc_sort_population	81.6517	96.009	14.3573	14.9
	error rate	%	desc_sort_population	0	0	0	-
升序排序查询	Min Throughput	ops/s	asc_sort_population	1.5	1.5	0	0.00
	Median Throughput	ops/s	asc_sort_population	1.51	1.51	0	0.00
	Max Throughput	ops/s	asc_sort_population	1.51	1.51	0	0.00
	50th percentile latency	ms	asc_sort_population	49.2469	57.9177	8.6708	14.9
	90th percentile latency	ms	asc_sort_population	67.5894	76.0044	8.415	11.0
	99th percentile latency	ms	asc_sort_population	84.6384	97.5143	12.8759	13.2
	100th percentile latency	ms	asc_sort_population	85.8124	97.5606	11.7482	12.0
	50th percentile service time	ms	asc_sort_population	47.8438	56.5861	8.7423	15.4
	90th percentile service time	ms	asc_sort_population	66.0821	74.7343	8.6522	11.5
	99th percentile service time	ms	asc_sort_population	83.6026	96.2868	12.6842	13.1
	100th percentile service time	ms	asc_sort_population	84.2175	96.6563	12.4388	12.8
	error rate	%	asc_sort_population	0	0	0	-
	升序排序后 after 跳转查询	Min Throughput	ops/s	asc_sort_with_after_population	1.5	1.5	0
Median Throughput		ops/s	asc_sort_with_after_population	1.51	1.51	0	0.00
Max Throughput		ops/s	asc_sort_with_after_population	1.51	1.51	0	0.00
50th percentile latency		ms	asc_sort_with_after_population	99.1943	83.423	-15.7713	-18.

说明	Metric	Unit	Task	腾讯云ES	社区版本	差异值 (社区版-ES)	差异 (差异社区)
	90th percentile latency	ms	asc_sort_with_after_population	86.0298	98.895	12.8652	13.0
	99th percentile latency	ms	asc_sort_with_after_population	102.268	131.329	29.061	22.1
	100th percentile latency	ms	asc_sort_with_after_population	106.33	132.25	25.92	19.6
	50th percentile service time	ms	asc_sort_with_after_population	68.2272	82.1201	13.8929	16.9
	90th percentile service time	ms	asc_sort_with_after_population	84.685	97.2085	12.5235	12.8
	99th percentile service time	ms	asc_sort_with_after_population	101.133	130.033	28.9	22.2
	100th percentile service time	ms	asc_sort_with_after_population	105.094	131.274	26.18	19.9
	error rate	%	asc_sort_with_after_population	0	0	0	-
高基字段降序排序查询（基于 DistanceFeatureQuery 快速取 topK）	Min Throughput	ops/s	desc_sort_geonameid	6.02	6.02	0	0.00
	Median Throughput	ops/s	desc_sort_geonameid	6.02	6.02	0	0.00
	Max Throughput	ops/s	desc_sort_geonameid	6.03	6.03	0	0.00
	50th percentile latency	ms	desc_sort_geonameid	5.53008	5.15391	-0.37617	-7.3
	90th percentile latency	ms	desc_sort_geonameid	6.20276	6.05507	-0.14769	-2.4
	99th percentile latency	ms	desc_sort_geonameid	6.67673	7.41936	0.74263	10.0
	100th percentile latency	ms	desc_sort_geonameid	6.95103	24.1732	17.22217	71.2
	50th percentile service time	ms	desc_sort_geonameid	4.61231	4.38941	-0.2229	-5.0

说明	Metric	Unit	Task	腾讯云ES	社区版本	差异值 (社区版-ES)	差异 (差异社区)
	90th percentile service time	ms	desc_sort_geonameid	5.45982	5.20354	-0.25628	-4.9
	99th percentile service time	ms	desc_sort_geonameid	5.65304	5.75262	0.09958	1.73
	100th percentile service time	ms	desc_sort_geonameid	5.65578	23.3192	17.66342	75.7
	error rate	%	desc_sort_geonameid	0	0	0	-
高基字段降序排序 after 跳转查询	Min Throughput	ops/s	desc_sort_with_after_geonameid	6.01	6.01	0	0.00
	Median Throughput	ops/s	desc_sort_with_after_geonameid	6.02	6.01	-0.01	-0.1
	Max Throughput	ops/s	desc_sort_with_after_geonameid	6.02	6.02	0	0.00
	50th percentile latency	ms	desc_sort_with_after_geonameid	56.5947	75.9327	19.338	25.4
	90th percentile latency	ms	desc_sort_with_after_geonameid	79.6503	88.6273	8.977	10.1
	99th percentile latency	ms	desc_sort_with_after_geonameid	87.7773	117.763	29.9857	25.4
	100th percentile latency	ms	desc_sort_with_after_geonameid	89.3947	118.003	28.6083	24.2
	50th percentile service time	ms	desc_sort_with_after_geonameid	55.4855	75.1241	19.6386	26.1
	90th percentile service time	ms	desc_sort_with_after_geonameid	79.2349	87.7269	8.492	9.68
	99th percentile service time	ms	desc_sort_with_after_geonameid	87.3803	116.924	29.5437	25.2
	100th percentile service time	ms	desc_sort_with_after_geonameid	88.3606	117.768	29.4074	24.9
	error rate	%	desc_sort_with_after_geonameid	0	0	0	-
高基字段升序排序查询 (基于	Min Throughput	ops/s	asc_sort_geonameid	6.02	6.02	0	0.00

DistanceFeatureQuery 快速取 topK) 说明	Metric	Unit	Task	腾讯云ES	社区版本	差异值 (社区版-ES)	差异 (差异社区)
	Median Throughput	ops/s	asc_sort_geonameid	6.02	6.02	0	0.00
	Max Throughput	ops/s	asc_sort_geonameid	6.03	6.03	0	0.00
	50th percentile latency	ms	asc_sort_geonameid	5.19317	4.49108	-0.70209	-15.
	90th percentile latency	ms	asc_sort_geonameid	5.74438	5.01747	-0.72691	-14.
	99th percentile latency	ms	asc_sort_geonameid	6.22846	5.49664	-0.73182	-13.
	100th percentile latency	ms	asc_sort_geonameid	11.6377	5.53539	-6.10231	-110
	50th percentile service time	ms	asc_sort_geonameid	4.35586	3.56597	-0.78989	-22.
	90th percentile service time	ms	asc_sort_geonameid	4.92152	3.97107	-0.95045	-23.
	99th percentile service time	ms	asc_sort_geonameid	5.38949	4.33548	-1.05401	-24.
	100th percentile service time	ms	asc_sort_geonameid	10.6436	4.5666	-6.077	-133
	error rate	%	asc_sort_geonameid	0	0	0	-
高基字段升序排序 after 跳转查询	Min Throughput	ops/s	asc_sort_with_after_geonameid	6.01	6.01	0	0.00
	Median Throughput	ops/s	asc_sort_with_after_geonameid	6.02	6.01	-0.01	-0.1
	Max Throughput	ops/s	asc_sort_with_after_geonameid	6.02	6.02	0	0.00
	50th percentile latency	ms	asc_sort_with_after_geonameid	58.1403	69.5377	11.3974	16.3
	90th percentile latency	ms	asc_sort_with_after_geonameid	76.5695	81.7929	5.2234	6.39
	99th percentile latency	ms	asc_sort_with_after_geonameid	91.6296	98.1089	6.4793	6.60

说明	Metric	Unit	Task	腾讯云ES	社区版本	差异值 (社区版-ES)	差异 (差异社区)
	100th percentile latency	ms	asc_sort_with_after_geonameid	91.6364	104.363	12.7266	12.1
	50th percentile service time	ms	asc_sort_with_after_geonameid	57.1683	68.532	11.3637	16.5
	90th percentile service time	ms	asc_sort_with_after_geonameid	75.7573	81.0123	5.255	6.49
	99th percentile service time	ms	asc_sort_with_after_geonameid	91.1533	97.807	6.6537	6.80
	100th percentile service time	ms	asc_sort_with_after_geonameid	91.3662	103.404	12.0378	11.6
	error rate	%	asc_sort_with_after_geonameid	0	0	0	-

4核16G 3节点与8核32G 3节点集群压测结果比较

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本文提供4核16G SSD 200G 3个节点与8核32G SSD 200G 3个节点规格的腾讯云 Elasticsearch Service 集群的压测比较结果。

说明:

数据为官方提供的 [geonames](#), 包含11396503条地理位置信息, 总大小接近3GB, 包含了 text、long、geo 等类型数据, 覆盖行列存。

说明	Metric	Unit	Task	4核16GB	8核32GB	差异值	差异
写入总耗时	Cumulative indexing time of primary shards	min	-	16.3633	14.2567	2.1066	12.
GC 总次数、耗时统计	Total Young Gen GC time	s	-	6.26	3.544	2.716	43.
	Total Young Gen GC count	次	-	892	447	445	49.
	Total Old Gen GC time	s	-	0	0	0	-
	Total Old Gen GC count	次	-	0	0	0	-
存储大小	Store size	GB	-	2.51866	2.59725	-0.07859	-3.
堆内存使用量	Heap used for segments	MB	-	0.803783	0.534325	0.269458	33.
	Heap used for doc values	MB	-	0.0284767	0.0507355	-0.0222588	-7.
	Heap used for terms	MB	-	0.655075	0.370026	0.285049	43.
	Heap used for norms	MB	-	0.0732422	0.0396729	0.0335693	45.
	Heap used for points	MB	-	0	0	0	-
	Heap used for stored fields	MB	-	0.0469894	0.0119553	0.0350341	74.
segment 总数量	Segment count	次	-	6	7	-1	-16
写入吞吐、耗时统计	Min Throughput	docs/s	index-append	89331.9	153730	-64398.1	-7.
	Median Throughput	docs/s	index-append	90268.8	159765	-69496.2	-7.
	Max Throughput	docs/s	index-append	90516.1	162791	-72274.9	-7.

说明	Metric	Unit	Task	4核16GB	8核32GB	差异值	差异
	50th percentile latency	ms	index-append	233.258	130.877	102.381	43.
	90th percentile latency	ms	index-append	314.558	162.969	151.589	48.
	99th percentile latency	ms	index-append	341.303	181.428	159.875	46.
	100th percentile latency	ms	index-append	354.657	225.98	128.677	36.
	50th percentile service time	ms	index-append	233.258	130.877	102.381	43.
	90th percentile service time	ms	index-append	314.558	162.969	151.589	48.
	99th percentile service time	ms	index-append	341.303	181.428	159.875	46.
	100th percentile service time	ms	index-append	354.657	225.98	128.677	36.
	error rate	%	index-append	0	0	0	-
index 指标统计	Min Throughput	ops/s	index-stats	90.04	90.05	-0.01	-0.
	Median Throughput	ops/s	index-stats	90.07	90.06	0.01	0.0
	Max Throughput	ops/s	index-stats	90.14	90.12	0.02	0.0
	50th percentile latency	ms	index-stats	2.91003	2.76736	0.14267	4.9
	90th percentile latency	ms	index-stats	3.82882	3.58235	0.24647	6.4
	99th percentile latency	ms	index-stats	4.2378	3.95798	0.27982	6.6
	99.9th percentile latency	ms	index-stats	4.34459	4.39377	-0.04918	-1.
	100th percentile latency	ms	index-stats	8.22393	9.00375	-0.77982	-9.

说明	Metric	Unit	Task	4核16GB	8核32GB	差异值	差异
	50th percentile service time	ms	index-stats	1.78268	1.57744	0.20524	11.1
	90th percentile service time	ms	index-stats	2.07484	1.8317	0.24314	11.7
	99th percentile service time	ms	index-stats	2.43121	2.0752	0.35601	14.1
	99.9th percentile service time	ms	index-stats	3.09198	2.24891	0.84307	27.1
	100th percentile service time	ms	index-stats	7.29974	2.31078	4.98896	68.1
	error rate	%	index-stats	0	0	0	-
node 指标统计	Min Throughput	ops/s	node-stats	90.06	90.06	0	0.0
	Median Throughput	ops/s	node-stats	90.09	90.12	-0.03	-0.1
	Max Throughput	ops/s	node-stats	90.34	90.36	-0.02	-0.1
	50th percentile latency	ms	node-stats	3.17223	2.9754	0.19683	6.2
	90th percentile latency	ms	node-stats	3.70681	4.07929	-0.37248	-10.1
	99th percentile latency	ms	node-stats	5.01334	5.0754	-0.06206	-1.1
	99.9th percentile latency	ms	node-stats	6.75018	6.53613	0.21405	3.1
	100th percentile latency	ms	node-stats	7.98905	6.93454	1.05451	13.1
	50th percentile service time	ms	node-stats	2.43876	2.23841	0.20035	8.2
	90th percentile service time	ms	node-stats	2.78272	2.65367	0.12905	4.6

说明	Metric	Unit	Task	4核16GB	8核32GB	差异值	差异
	99th percentile service time	ms	node-stats	4.12234	3.92073	0.20161	4.8
	99.9th percentile service time	ms	node-stats	6.35902	4.92842	1.4306	22.
	100th percentile service time	ms	node-stats	7.4313	5.92757	1.50373	20.
	error rate	%	node-stats	0	0	0	-
默认查询, 所有文档 score 为1 (match_all)	Min Throughput	ops/s	default	50.03	50.03	0	0.0
	Median Throughput	ops/s	default	50.04	50.04	0	0.0
	Max Throughput	ops/s	default	50.08	50.08	0	0.0
	50th percentile latency	ms	default	3.89929	3.53894	0.36035	9.2
	90th percentile latency	ms	default	4.39236	4.11403	0.27833	6.3
	99th percentile latency	ms	default	4.78834	4.92737	-0.13903	-2.
	99.9th percentile latency	ms	default	7.10486	5.74037	1.36449	19.
	100th percentile latency	ms	default	8.75822	7.32557	1.43265	16.
	50th percentile service time	ms	default	3.18269	2.7831	0.39959	12.
	90th percentile service time	ms	default	3.49347	3.17322	0.32025	9.1
	99th percentile service time	ms	default	3.8746	3.77477	0.09983	2.5
	99.9th percentile service time	ms	default	6.68581	4.19186	2.49395	37.

说明	Metric	Unit	Task	4核16GB	8核32GB	差异值	差异
	100th percentile service time	ms	default	8.30396	6.58243	1.72153	20.
	error rate	%	default	0	0	0	-
term 条件查询	Min Throughput	ops/s	term	100.05	99.66	0.39	0.3
	Median Throughput	ops/s	term	100.07	100.07	0	0.0
	Max Throughput	ops/s	term	100.14	100.11	0.03	0.0
	50th percentile latency	ms	term	3.17419	2.83987	0.33432	10.
	90th percentile latency	ms	term	3.62229	3.32569	0.2966	8.1
	99th percentile latency	ms	term	4.03812	3.96055	0.07757	1.9
	99.9th percentile latency	ms	term	5.9753	4.33961	1.63569	27.
	100th percentile latency	ms	term	8.03321	5.70421	2.329	28.
	50th percentile service time	ms	term	2.49755	2.08935	0.4082	16.
	90th percentile service time	ms	term	2.71322	2.53284	0.18038	6.6
	99th percentile service time	ms	term	3.20673	2.99484	0.21189	6.6
	99.9th percentile service time	ms	term	5.17998	3.37709	1.80289	34.
	100th percentile service time	ms	term	6.95227	5.24029	1.71198	24.
	error rate	%	term	0	0	0	-
	词组查询 (query)	Min Throughput	ops/s	phrase	110.05	110.04	0.01
Median Throughput		ops/s	phrase	110.07	110.08	-0.01	-0.

说明	Metric	Unit	Task	4核16GB	8核32GB	差异值	差异
	Max Throughput	ops/s	phrase	110.12	110.11	0.01	0.0
	50th percentile latency	ms	phrase	3.09905	2.74088	0.35817	11.1
	90th percentile latency	ms	phrase	3.62549	3.30207	0.32342	8.9
	99th percentile latency	ms	phrase	4.55457	4.8127	-0.25813	-5.
	99.9th percentile latency	ms	phrase	8.29519	5.57204	2.72315	32.
	100th percentile latency	ms	phrase	9.39771	6.54587	2.85184	30.
	50th percentile service time	ms	phrase	2.38248	1.98839	0.39409	16.
	90th percentile service time	ms	phrase	2.77084	2.41365	0.35719	12.
	99th percentile service time	ms	phrase	3.75448	4.00121	-0.24673	-6.
	99.9th percentile service time	ms	phrase	7.5974	4.70793	2.88947	38.
	100th percentile service time	ms	phrase	8.98362	5.67829	3.30533	36.
	error rate	%	phrase	0	0	0	-
不带缓存的聚合查询 (aggregation)	Min Throughput	ops/s	country_agg_uncached	3.6	3.6	0	0.0
	Median Throughput	ops/s	country_agg_uncached	3.61	3.61	0	0.0
	Max Throughput	ops/s	country_agg_uncached	3.61	3.61	0	0.0
	50th percentile latency	ms	country_agg_uncached	157.466	130.314	27.152	17.
	90th percentile latency	ms	country_agg_uncached	217.148	147.567	69.581	32.

说明	Metric	Unit	Task	4核16GB	8核32GB	差异值	差异
	99th percentile latency	ms	country_agg_uncached	233.185	165.174	68.011	29.
	100th percentile latency	ms	country_agg_uncached	233.227	174.015	59.212	25.
	50th percentile service time	ms	country_agg_uncached	156.197	129.186	27.011	17.
	90th percentile service time	ms	country_agg_uncached	215.852	146.921	68.931	31.
	99th percentile service time	ms	country_agg_uncached	232.177	164.579	67.598	29.
	100th percentile service time	ms	country_agg_uncached	232.321	172.827	59.494	25.
	error rate	%	country_agg_uncached	0	0	0	-
带缓存的聚合查询 (aggregation)	Min Throughput	ops/s	country_agg_cached	100.03	100.04	-0.01	-0.
	Median Throughput	ops/s	country_agg_cached	100.05	100.05	0	0.0
	Max Throughput	ops/s	country_agg_cached	100.08	100.08	0	0.0
	50th percentile latency	ms	country_agg_cached	2.44457	2.29531	0.14926	6.1
	90th percentile latency	ms	country_agg_cached	2.97922	3.57418	-0.59496	-19
	99th percentile latency	ms	country_agg_cached	3.96393	3.91685	0.04708	1.19
	99.9th percentile latency	ms	country_agg_cached	5.3294	4.19749	1.13191	21.
	100th percentile latency	ms	country_agg_cached	7.9529	4.51842	3.43448	43.
	50th percentile service time	ms	country_agg_cached	1.71924	1.57861	0.14063	8.1
	90th percentile service time	ms	country_agg_cached	1.97892	1.89111	0.08781	4.4

说明	Metric	Unit	Task	4核16GB	8核32GB	差异值	差异
	99th percentile service time	ms	country_agg_cached	2.22611	2.19488	0.03123	1.4
	99.9th percentile service time	ms	country_agg_cached	5.0967	3.42563	1.67107	32.
	100th percentile service time	ms	country_agg_cached	7.02246	4.28971	2.73275	38.
	error rate	%	country_agg_cached	0	0	0	-
分页拉取	Min Throughput	pages/s	scroll	20.04	20.04	0	0.0
	Median Throughput	pages/s	scroll	20.04	20.05	-0.01	-0.
	Max Throughput	pages/s	scroll	20.05	20.06	-0.01	-0.
	50th percentile latency	ms	scroll	576.675	538.421	38.254	6.6
	90th percentile latency	ms	scroll	585.156	543.566	41.59	7.1
	99th percentile latency	ms	scroll	598.95	582.263	16.687	2.7
	100th percentile latency	ms	scroll	602.009	584.75	17.259	2.8
	50th percentile service time	ms	scroll	575.118	537.068	38.05	6.6
	90th percentile service time	ms	scroll	583.906	542.428	41.478	7.1
	99th percentile service time	ms	scroll	597.482	580.372	17.11	2.8
	100th percentile service time	ms	scroll	600.578	583.612	16.966	2.8
	error rate	%	scroll	0	0	0	-
脚本查询 (使用 expression 脚本)	Min Throughput	ops/s	expression	2	2	0	0.0
	Median Throughput	ops/s	expression	2	2	0	0.0

说明	Metric	Unit	Task	4核16GB	8核32GB	差异值	差异
	Max Throughput	ops/s	expression	2	2	0	0.0
	50th percentile latency	ms	expression	299.685	265.631	34.054	11.1
	90th percentile latency	ms	expression	416.613	287.121	129.492	31.1
	99th percentile latency	ms	expression	465.776	311.788	153.988	33.1
	100th percentile latency	ms	expression	468.083	391.745	76.338	16.1
	50th percentile service time	ms	expression	298.594	264.462	34.132	11.1
	90th percentile service time	ms	expression	415.045	285.113	129.932	31.1
	99th percentile service time	ms	expression	464.598	310.991	153.607	33.1
	100th percentile service time	ms	expression	467.106	390.33	76.776	16.1
	error rate	%	expression	0	0	0	-
脚本查询（使用 painless 静态脚本，不动态取字段值）	Min Throughput	ops/s	painless_static	1.5	1.5	0	0.0
	Median Throughput	ops/s	painless_static	1.5	1.5	0	0.0
	Max Throughput	ops/s	painless_static	1.5	1.5	0	0.0
	50th percentile latency	ms	painless_static	383.485	337.96	45.525	11.1
	90th percentile latency	ms	painless_static	514.495	358.738	155.757	30.1
	99th percentile latency	ms	painless_static	561.342	375.017	186.325	33.1
	100th percentile latency	ms	painless_static	568.066	395.417	172.649	30.1

说明	Metric	Unit	Task	4核16GB	8核32GB	差异值	差异
	50th percentile service time	ms	painless_static	382.158	337.111	45.047	11.1
	90th percentile service time	ms	painless_static	513.202	357.771	155.431	30.1
	99th percentile service time	ms	painless_static	560.61	374.121	186.489	33.1
	100th percentile service time	ms	painless_static	567.419	394.632	172.787	30.1
	error rate	%	painless_static	0	0	0	-
脚本查询（使用 painless 静态脚本，动态获取字段值）	Min Throughput	ops/s	painless_dynamic	1.5	1.5	0	0.0
	Median Throughput	ops/s	painless_dynamic	1.5	1.5	0	0.0
	Max Throughput	ops/s	painless_dynamic	1.5	1.5	0	0.0
	50th percentile latency	ms	painless_dynamic	377.278	334.684	42.594	11.1
	90th percentile latency	ms	painless_dynamic	517.496	354.406	163.09	31.1
	99th percentile latency	ms	painless_dynamic	576.697	377.214	199.483	34.1
	100th percentile latency	ms	painless_dynamic	580.017	381.276	198.741	34.1
	50th percentile service time	ms	painless_dynamic	376.339	333.654	42.685	11.1
	90th percentile service time	ms	painless_dynamic	516.407	353.246	163.161	31.1
	99th percentile service time	ms	painless_dynamic	575.714	375.956	199.758	34.1
	100th percentile service time	ms	painless_dynamic	579.642	379.75	199.892	34.1
error rate	%	painless_dynamic	0	0	0	-	

说明	Metric	Unit	Task	4核16GB	8核32GB	差异值	差异
地理范围查询（基于高斯衰减函数）	Min Throughput	ops/s	decay_geo_gauss_function_score	1	1	0	0.0
	Median Throughput	ops/s	decay_geo_gauss_function_score	1	1	0	0.0
	Max Throughput	ops/s	decay_geo_gauss_function_score	1	1	0	0.0
	50th percentile latency	ms	decay_geo_gauss_function_score	348.531	327.972	20.559	5.9
	90th percentile latency	ms	decay_geo_gauss_function_score	398.351	336.979	61.372	15.
	99th percentile latency	ms	decay_geo_gauss_function_score	411.483	343.562	67.921	16.
	100th percentile latency	ms	decay_geo_gauss_function_score	457.615	344.135	113.48	24.
	50th percentile service time	ms	decay_geo_gauss_function_score	346.881	326.554	20.327	5.8
	90th percentile service time	ms	decay_geo_gauss_function_score	397.08	336.053	61.027	15.
	99th percentile service time	ms	decay_geo_gauss_function_score	410.421	342.151	68.27	16.
	100th percentile service time	ms	decay_geo_gauss_function_score	455.704	342.843	112.861	24.
	error rate	%	decay_geo_gauss_function_score	0	0	0	-
地理范围查询（基于高斯衰减函数，且脚本动态获取字段值）	Min Throughput	ops/s	decay_geo_gauss_script_score	1	1	0	0.0
	Median Throughput	ops/s	decay_geo_gauss_script_score	1	1	0	0.0
	Max Throughput	ops/s	decay_geo_gauss_script_score	1	1	0	0.0
	50th percentile latency	ms	decay_geo_gauss_script_score	368.275	341.152	27.123	7.3
	90th percentile latency	ms	decay_geo_gauss_script_score	414.905	349.94	64.965	15.
	99th percentile latency	ms	decay_geo_gauss_script_score	468.888	354.76	114.128	24.

说明	Metric	Unit	Task	4核16GB	8核32GB	差异值	差异
	100th percentile latency	ms	decay_geo_gauss_script_score	477.25	364.169	113.081	23.
	50th percentile service time	ms	decay_geo_gauss_script_score	366.945	339.967	26.978	7.3
	90th percentile service time	ms	decay_geo_gauss_script_score	413.609	348.493	65.116	15.
	99th percentile service time	ms	decay_geo_gauss_script_score	467.627	353.559	114.068	24.
	100th percentile service time	ms	decay_geo_gauss_script_score	475.367	362.748	112.619	23.
	error rate	%	decay_geo_gauss_script_score	0	0	0	-
自定义评分函数查询 (基于字段值定义函数)	Min Throughput	ops/s	field_value_function_score	1.5	1.5	0	0.0
	Median Throughput	ops/s	field_value_function_score	1.5	1.5	0	0.0
	Max Throughput	ops/s	field_value_function_score	1.51	1.51	0	0.0
	50th percentile latency	ms	field_value_function_score	139.661	120.538	19.123	13.
	90th percentile latency	ms	field_value_function_score	183.675	137.702	45.973	25.
	99th percentile latency	ms	field_value_function_score	197.653	147.851	49.802	25.
	100th percentile latency	ms	field_value_function_score	202.345	169.961	32.384	16.
	50th percentile service time	ms	field_value_function_score	138.423	119.159	19.264	13.
	90th percentile service time	ms	field_value_function_score	182.404	136.338	46.066	25.
	99th percentile service time	ms	field_value_function_score	196.734	146.981	49.753	25.

说明	Metric	Unit	Task	4核16GB	8核32GB	差异值	差异	
	100th percentile service time	ms	field_value_function_score	201.442	168.964	32.478	16.	
	error rate	%	field_value_function_score	0	0	0	-	
自定义评分函数查询（通过脚本动态获取字段值计算评分）	Min Throughput	ops/s	field_value_script_score	1.5	1.5	0	0.0	
	Median Throughput	ops/s	field_value_script_score	1.5	1.5	0	0.0	
	Max Throughput	ops/s	field_value_script_score	1.51	1.51	0	0.0	
	50th percentile latency	ms	field_value_script_score	188.952	168.069	20.883	11.0	
	90th percentile latency	ms	field_value_script_score	264.095	178.933	85.162	32.0	
	99th percentile latency	ms	field_value_script_score	271.153	196.982	74.171	27.0	
	100th percentile latency	ms	field_value_script_score	271.901	198.722	73.179	26.0	
	50th percentile service time	ms	field_value_script_score	187.218	166.827	20.391	10.0	
	90th percentile service time	ms	field_value_script_score	263.207	177.869	85.338	32.0	
	99th percentile service time	ms	field_value_script_score	269.578	195.586	73.992	27.0	
	100th percentile service time	ms	field_value_script_score	270.138	197.054	73.084	27.0	
	error rate	%	field_value_script_score	0	0	0	-	
	大量 terms 条件查询 (query)	Min Throughput	ops/s	large_terms	1.1	1.1	0	0.0
		Median Throughput	ops/s	large_terms	1.1	1.1	0	0.0
Max Throughput		ops/s	large_terms	1.1	1.1	0	0.0	
50th percentile latency		ms	large_terms	265.007	241.322	23.685	8.9	

说明	Metric	Unit	Task	4核16GB	8核32GB	差异值	差异
	90th percentile latency	ms	large_terms	296.009	252.637	43.372	14.
	99th percentile latency	ms	large_terms	310.358	265.807	44.551	14.
	100th percentile latency	ms	large_terms	311.049	272.611	38.438	12.
	50th percentile service time	ms	large_terms	256.372	233.129	23.243	9.0
	90th percentile service time	ms	large_terms	287.851	244.494	43.357	15.
	99th percentile service time	ms	large_terms	301.827	258.894	42.933	14.
	100th percentile service time	ms	large_terms	302.251	264.352	37.899	12.
	error rate	%	large_terms	0	0	0	-
大量 terms 条件过滤查询 (query、filter)	Min Throughput	ops/s	large_filtered_terms	1.1	1.1	0	0.0
	Median Throughput	ops/s	large_filtered_terms	1.1	1.1	0	0.0
	Max Throughput	ops/s	large_filtered_terms	1.1	1.1	0	0.0
	50th percentile latency	ms	large_filtered_terms	268.135	233.192	34.943	13.
	90th percentile latency	ms	large_filtered_terms	304.158	241.102	63.056	20.
	99th percentile latency	ms	large_filtered_terms	351.209	251.835	99.374	28.
	100th percentile latency	ms	large_filtered_terms	352.003	260.27	91.733	26.
	50th percentile service time	ms	large_filtered_terms	259.546	225.052	34.494	13.
	90th percentile service time	ms	large_filtered_terms	295.721	233.16	62.561	21.

说明	Metric	Unit	Task	4核16GB	8核32GB	差异值	差异
	99th percentile service time	ms	large_filtered_terms	342.342	243.603	98.739	28.
	100th percentile service time	ms	large_filtered_terms	343.378	252.129	91.249	26.
	error rate	%	large_filtered_terms	0	0	0	-
大量条件取反查询 (query、must not)	Min Throughput	ops/s	large_prohibited_terms	1.1	1.1	0	0.0
	Median Throughput	ops/s	large_prohibited_terms	1.1	1.1	0	0.0
	Max Throughput	ops/s	large_prohibited_terms	1.1	1.1	0	0.0
	50th percentile latency	ms	large_prohibited_terms	270.041	235.179	34.862	12.
	90th percentile latency	ms	large_prohibited_terms	310.351	241.076	69.275	22.
	99th percentile latency	ms	large_prohibited_terms	347.414	255.983	91.431	26.
	100th percentile latency	ms	large_prohibited_terms	349.499	259.046	90.453	25.
	50th percentile service time	ms	large_prohibited_terms	261.734	227.487	34.247	13.
	90th percentile service time	ms	large_prohibited_terms	302.279	233.792	68.487	22.
	99th percentile service time	ms	large_prohibited_terms	339.278	248.53	90.748	26.
	100th percentile service time	ms	large_prohibited_terms	340.817	251.083	89.734	26.
	error rate	%	large_prohibited_terms	0	0	0	-
降序排序查询	Min Throughput	ops/s	desc_sort_population	1.5	1.5	0	0.0
	Median Throughput	ops/s	desc_sort_population	1.51	1.51	0	0.0
	Max Throughput	ops/s	desc_sort_population	1.51	1.51	0	0.0

说明	Metric	Unit	Task	4核16GB	8核32GB	差异值	差异
	50th percentile latency	ms	desc_sort_population	58.5828	48.387	10.1958	17.
	90th percentile latency	ms	desc_sort_population	77.9981	63.073	14.9251	19.
	99th percentile latency	ms	desc_sort_population	80.8863	71.7498	9.1365	11.:
	100th percentile latency	ms	desc_sort_population	83.1661	83.3593	-0.1932	-0.
	50th percentile service time	ms	desc_sort_population	57.1212	47.0436	10.0776	17.
	90th percentile service time	ms	desc_sort_population	76.7082	61.3731	15.3351	19.
	99th percentile service time	ms	desc_sort_population	79.2907	70.4811	8.8096	11.:
	100th percentile service time	ms	desc_sort_population	81.6364	81.6517	-0.0153	-0.
	error rate	%	desc_sort_population	0	0	0	-
升序排序查询	Min Throughput	ops/s	asc_sort_population	1.5	1.5	0	0.0
	Median Throughput	ops/s	asc_sort_population	1.51	1.51	0	0.0
	Max Throughput	ops/s	asc_sort_population	1.51	1.51	0	0.0
	50th percentile latency	ms	asc_sort_population	62.4328	49.2469	13.1859	21.
	90th percentile latency	ms	asc_sort_population	79.8441	67.5894	12.2547	15.
	99th percentile latency	ms	asc_sort_population	83.9411	84.6384	-0.6973	-0.
	100th percentile latency	ms	asc_sort_population	84.3925	85.8124	-1.4199	-1.
	50th percentile service time	ms	asc_sort_population	61.0637	47.8438	13.2199	21.

说明	Metric	Unit	Task	4核16GB	8核32GB	差异值	差异
	90th percentile service time	ms	asc_sort_population	78.4101	66.0821	12.328	15.
	99th percentile service time	ms	asc_sort_population	82.2652	83.6026	-1.3374	-1.
	100th percentile service time	ms	asc_sort_population	82.5616	84.2175	-1.6559	-2.
	error rate	%	asc_sort_population	0	0	0	-
升序排序后 after 跳转查询	Min Throughput	ops/s	asc_sort_with_after_population	1.5	1.5	0	0.0
	Median Throughput	ops/s	asc_sort_with_after_population	1.51	1.51	0	0.0
	Max Throughput	ops/s	asc_sort_with_after_population	1.51	1.51	0	0.0
	50th percentile latency	ms	asc_sort_with_after_population	88.1871	99.1943	-11.0072	-12
	90th percentile latency	ms	asc_sort_with_after_population	127.995	86.0298	41.9652	32.
	99th percentile latency	ms	asc_sort_with_after_population	131.171	102.268	28.903	22.
	100th percentile latency	ms	asc_sort_with_after_population	132.181	106.33	25.851	19.
	50th percentile service time	ms	asc_sort_with_after_population	87.132	68.2272	18.9048	21.
	90th percentile service time	ms	asc_sort_with_after_population	126.818	84.685	42.133	33.
	99th percentile service time	ms	asc_sort_with_after_population	129.453	101.133	28.32	21.
	100th percentile service time	ms	asc_sort_with_after_population	130.452	105.094	25.358	19.
	error rate	%	asc_sort_with_after_population	0	0	0	-
高基字段降序排序查询（基于 DistanceFeatureQuery 快速取 topK）	Min Throughput	ops/s	desc_sort_geonameid	6.02	6.02	0	0.0
	Median Throughput	ops/s	desc_sort_geonameid	6.02	6.02	0	0.0

说明	Metric	Unit	Task	4核16GB	8核32GB	差异值	差异
	Max Throughput	ops/s	desc_sort_geonameid	6.03	6.03	0	0.0
	50th percentile latency	ms	desc_sort_geonameid	7.4659	5.53008	1.93582	25.
	90th percentile latency	ms	desc_sort_geonameid	8.26766	6.20276	2.0649	24.
	99th percentile latency	ms	desc_sort_geonameid	8.72369	6.67673	2.04696	23.
	100th percentile latency	ms	desc_sort_geonameid	8.79956	6.95103	1.84853	21.
	50th percentile service time	ms	desc_sort_geonameid	6.59986	4.61231	1.98755	30.
	90th percentile service time	ms	desc_sort_geonameid	7.24539	5.45982	1.78557	24.
	99th percentile service time	ms	desc_sort_geonameid	7.57925	5.65304	1.92621	25.
	100th percentile service time	ms	desc_sort_geonameid	7.64471	5.65578	1.98893	26.
	error rate	%	desc_sort_geonameid	0	0	0	-
高基字段降序排序 after 跳转查询	Min Throughput	ops/s	desc_sort_with_after_geonameid	6.01	6.01	0	0.0
	Median Throughput	ops/s	desc_sort_with_after_geonameid	6.01	6.02	-0.01	-0.
	Max Throughput	ops/s	desc_sort_with_after_geonameid	6.02	6.02	0	0.0
	50th percentile latency	ms	desc_sort_with_after_geonameid	89.4587	56.5947	32.864	36.
	90th percentile latency	ms	desc_sort_with_after_geonameid	119.777	79.6503	40.1267	33.
	99th percentile latency	ms	desc_sort_with_after_geonameid	123.271	87.7773	35.4937	28.
	100th percentile latency	ms	desc_sort_with_after_geonameid	123.628	89.3947	34.2333	27.

说明	Metric	Unit	Task	4核16GB	8核32GB	差异值	差异
	50th percentile service time	ms	desc_sort_with_after_geonameid	88.512	55.4855	33.0265	37.
	90th percentile service time	ms	desc_sort_with_after_geonameid	118.72	79.2349	39.4851	33.
	99th percentile service time	ms	desc_sort_with_after_geonameid	122.79	87.3803	35.4097	28.
	100th percentile service time	ms	desc_sort_with_after_geonameid	122.791	88.3606	34.4304	28.
	error rate	%	desc_sort_with_after_geonameid	0	0	0	-
高基字段升序排序查询（基于 DistanceFeatureQuery 快速取 topK）	Min Throughput	ops/s	asc_sort_geonameid	6.02	6.02	0	0.0
	Median Throughput	ops/s	asc_sort_geonameid	6.02	6.02	0	0.0
	Max Throughput	ops/s	asc_sort_geonameid	6.03	6.03	0	0.0
	50th percentile latency	ms	asc_sort_geonameid	5.80593	5.19317	0.61276	10.
	90th percentile latency	ms	asc_sort_geonameid	6.55438	5.74438	0.81	12.
	99th percentile latency	ms	asc_sort_geonameid	7.36432	6.22846	1.13586	15.
	100th percentile latency	ms	asc_sort_geonameid	7.49672	11.6377	-4.14098	-5.
	50th percentile service time	ms	asc_sort_geonameid	4.91916	4.35586	0.5633	11.
	90th percentile service time	ms	asc_sort_geonameid	5.61126	4.92152	0.68974	12.
	99th percentile service time	ms	asc_sort_geonameid	6.12285	5.38949	0.73336	11.
	100th percentile service time	ms	asc_sort_geonameid	6.51222	10.6436	-4.13138	-6.
	error rate	%	asc_sort_geonameid	0	0	0	-

说明	Metric	Unit	Task	4核16GB	8核32GB	差异值	差异
高基字段升序排序 after 跳转查询	Min Throughput	ops/s	asc_sort_with_after_geonameid	6.01	6.01	0	0.0
	Median Throughput	ops/s	asc_sort_with_after_geonameid	6.01	6.02	-0.01	-0.
	Max Throughput	ops/s	asc_sort_with_after_geonameid	6.01	6.02	-0.01	-0.
	50th percentile latency	ms	asc_sort_with_after_geonameid	70.994	58.1403	12.8537	18.
	90th percentile latency	ms	asc_sort_with_after_geonameid	104.817	76.5695	28.2475	26.
	99th percentile latency	ms	asc_sort_with_after_geonameid	108.797	91.6296	17.1674	15.
	100th percentile latency	ms	asc_sort_with_after_geonameid	108.929	91.6364	17.2926	15.
	50th percentile service time	ms	asc_sort_with_after_geonameid	69.7056	57.1683	12.5373	17.
	90th percentile service time	ms	asc_sort_with_after_geonameid	103.875	75.7573	28.1177	27.
	99th percentile service time	ms	asc_sort_with_after_geonameid	107.828	91.1533	16.6747	15.
	100th percentile service time	ms	asc_sort_with_after_geonameid	108.539	91.3662	17.1728	15.
	error rate	%	asc_sort_with_after_geonameid	0	0	0	-

高级特性(X-Pack)

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简介

高级特性，是指 Elasticsearch 官方商业特性（原 X-Pack 商业版插件包含的特性），包含了安全（Security）、SQL、机器学习（Machine Learning）、监控（Monitor）等高级功能，可以为 Elasticsearch 服务的应用开发和运维管理，提供更有力的帮助。腾讯云 ES 已提供了包含高级特性的版本，您可以在创建购买集群时选择，下文介绍各版本详细功能。

购买指引



如上图所示，在腾讯云 ES 创建购买页，有高级特性版本选项。腾讯云 ES 提供了3种可选的高级特性版本，版本说明如下：

对比项	基础版	白金版	开源版
是否包含 X-Pack	✓	✓	×
X-Pack 功能完整度	部分	全部	无

购买推荐

为了能够使用腾讯云 Elasticsearch 更多高级功能，我们建议您在创建购买集群时，选择**白金版**，各版本具体功能介绍及区别见下文，产品的定价信息详见 [Elasticsearch Service 集群定价](#)。

高级特性介绍

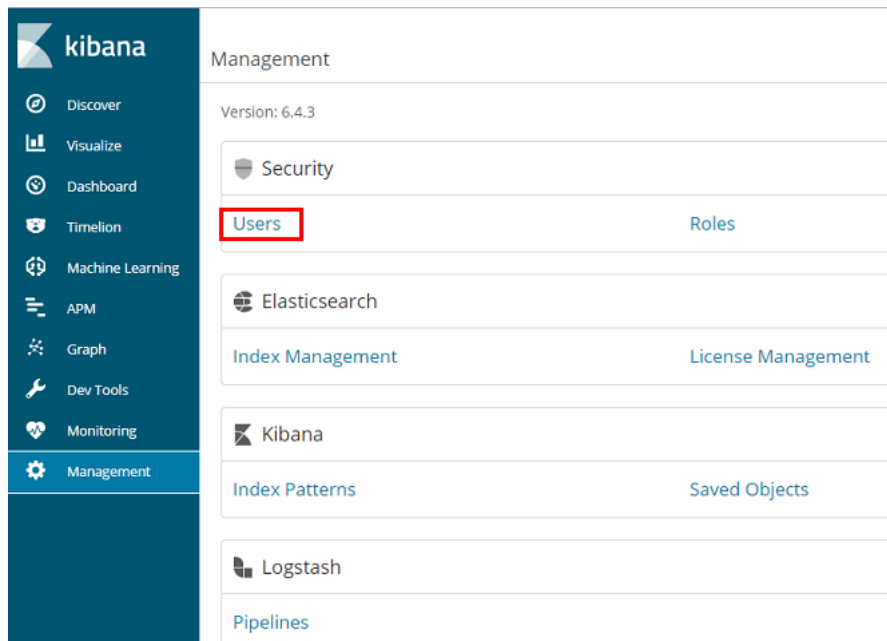
本文对部分常用高级特性进行了说明，完整的高级特性及说明，可查看官方说明 [Elastic Stack 订阅](#)、[API 文档](#)。

⚠ 注意：

- 部分功能在不同的高级特性版本（基础、白金、开源）间有区别。
- 部分功能在较老的腾讯云 ES 版本不支持，若您遇到此问题，可通过 [售后支持](#) 咨询。

• 安全（Security）

支持索引和字段级别读写等细分权限的控制管理，实现数据安全防护、业务访问隔离，向正确的人员授予访问权限，阻止恶意破坏和数据泄露，有效的保障数据安全。

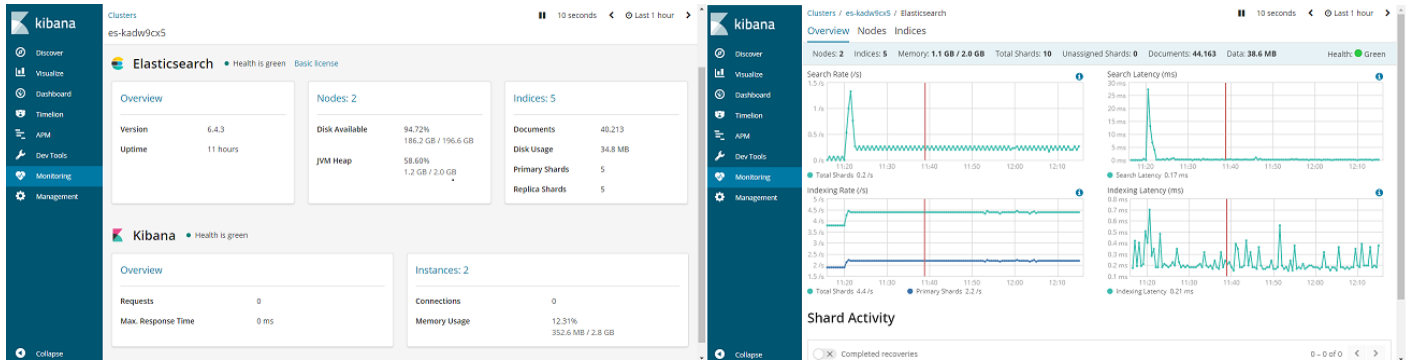


机器学习 (Machine Learning)

在自定义数据告警的应用场景中，对于较难设置规则和阈值来定义的变化，可通过结合非监督型机器学习来预测数据的变化趋势和合理的波动范围，在数据偏离正常变化趋势时，发出告警通知。

监控

集群、节点、索引多个维度，全方位监控，实时了解集群运行情况，辅助应用开发及运维。



SQL

提供了通过传统数据库 SQL 工具，实现对 Elasticsearch 数据进行全文检索、数据统计分析功能，支持 CLI、REST 等接入方式，白金版还支持 JDBC 连接。可以实现同原有业务系统的无缝对接，降低新技术学习成本。

```

1 POST _opack/sql?format=text
2 {
3   "query": "select * from website"
4 }
5
6 My first blog post
7 My second blog post
8 My first blog post
9 My second blog post
10 My first blog post
11 My second blog post
12 My second blog post
13 My first blog post
14 My first blog post
15 My second blog post
16 My first blog post
17 My second blog post
    
```

说明:

SQL 支持方面，开源版集成了其他的 SQL 插件，详细了解和使用时可查看 [elasticsearch-sql](#)。

高级特性版本功能详细对比

本节主要对不同 ES 版本的部分重点功能做对比说明，方便用户了解不同版本中功能的区别。因 Elasticsearch 正处于快速发展阶段，不同版本对各功能的支持情况也在不断调整，所以我们不保证下述内容能及时跟进社区变化。

了解最新准确的功能对比，可查看 Elasticsearch 官方介绍 [Elastic Stack 订阅](#)。

说明:

下表中●、◐、◑、—用于表示对应特性的功能完整度，●：包含全部功能；◐：包含部分功能；—：不包含。

模块	特性	开源版	基础版	白金版
Elasticsearch	可扩展性和弹性	◐	◐	●
	查询和分析	◐	◐	●
	数据扩充	●	●	●
	管理和工具	◐	◐	●
	Security	—	—	●
Kibana	机器学习	—	—	●
	探索和可视化	◐	◐	●
	堆栈管理和工具	◐	◐	●
	堆栈监测	—	◐	●
	分享与合作	◐	◐	●

	Security	—	—	●
	机器学习	—	—	●
Beats	数据收集	○	○	●
	数据传输	○	○	●
	模块	○	○	●
	监测和管理	—	○	●
Logstash	数据收集	●	●	●
	数据扩充	●	●	●
	数据传输	●	●	●
	模块	○	●	●
	监测和管理	—	○	●
ELASTIC APM	APM 服务器	●	●	●
	APM 代理	●	●	●
	Kibana 中的 APM 仪表盘	●	●	●
	APM UI	—	●	●
	分布式跟踪	—	●	●
	Machine Learning 整合	—	—	●
ELASTIC 日志	日志采集器 (Filebeat)	●	●	●
	常用数据源的仪表盘	●	●	●
	Logs UI	—	●	●
ELASTIC 基础设施	指标采集器 (Metricbeat)	●	●	●
	常用数据源的仪表盘	●	●	●
	Infrastructure UI	—	●	●
ELASTIC 运行状态监控	运行状态监测 (Heartbeat)	●	●	●
	Kibana 里的运行状态仪表盘	●	●	●
	运行状态监测 UI	—	●	●

Elasticsearch 部分功能详细说明：
说明：

下表中 ✓ 用于表示是否拥有对应特性的功能，✓：表示具备；—：表示不具备。

Elasticsearch功能模块	细项	开源版	基础版	白金版
管理和工具	REST API	✓	✓	✓
	语言客户端	✓	✓	✓
	快照/恢复	✓	✓	✓
	_仅源快照	—	✓	✓
	SQL 解释器 CLI	—	✓	✓
	数据汇总	—	✓	✓

	索引生命周期管理	-	✓	✓
	冻结索引	-	✓	✓
	升级助手 API	-	✓	✓
	JDBC 客户端	-	-	✓
	ODBC 客户端	-	-	✓
Security	加密通信	-	✓	✓
	基于角色的访问控制	-	✓	✓
	文件和原生身份验证	-	✓	✓
	审核日志	-	-	-
	基于属性的权限控制	-	-	✓
	字段和文档级别安全性	-	-	✓
机器学习	时序型异常监测	-	-	✓
	输入/实体分析	-	-	✓
	日志消息分类	-	-	✓
	根本原因指示	-	-	✓
	异常情况警报	-	-	✓
	时序型预测	-	-	✓

产品优势

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腾讯云 ES 提供了云端托管的服务，用户可容易地创建和管理 Elasticsearch 集群，并且能够保障生产环境中的高可用性。下文是对产品核心优势的介绍：

易于部署和管理

您只需通过简单的操作，即可在几分钟内创建一个 ES 集群，免去软硬件部署调试的复杂流程。此外，ES 还提供了便捷的集群运营管理工作、Kibana 页面以及完善的集群监控和告警系统，以满足客户日常的集群运营管理需求。

弹性扩缩容

ES 提供了多种类型的节点规格和存储介质，您可以根据业务需要进行选择。随着业务的发展，您可以动态调整集群的配置扩容或缩容，实时保障业务的发展需要并有效控制成本。

Elasticsearch 高级特性 (X-Pack)

集成 Security、SQL、Machine Learning 等 Elasticsearch 高级特性 (X-Pack)，提升了 Elasticsearch 集群的安全管控、操作使用和运维管理效率。

高可用

ES 提供了多可用区部署方案，可保证在单可用区网络、电力等不可抗力故障下不停服。COS 数据备份策略可定时备份数据，保障数据在意外情况下丢失时快速恢复。此外还有为保障集群稳定而进行的内核优化等策略，可以全方位地保障数据的安全和服务的稳定。

安全加固

通过部署在逻辑隔离的私有网络 VPC，客户可以完全掌控自己的环境配置，自定义网络访问控制列表 (Access Control List) 和安全组，提供了 Kibana 访问和 IP 访问黑白名单机制，高级特性 (X-Pack) 的 Security 能力提供了字段级的权限控制，切实保证您云上资源的安全性。

开放与服务集成

支持完整的 ELK 产品体系，兼容标准的开源 RESTful API 和生态组件，可以与对象存储 COS、网络流日志、消息队列、云数据库 TencentDB 等腾讯云产品集成，为用户提供数据传输和备份能力，以满足不同业务场景需要。

应用场景

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日志分析

网站服务器、移动设备、IOT 传感器等设备产生的日志都存在节点分散、种类多样、规模庞大等问题，这对需要通过日志搜索进行异常问题定位和业务分析等工作造成了很大的挑战。ES 提供了弹性可扩展、实时的集中式存储方案以及全文搜索功能，方便日志的统一管理和查询，帮助用户快速定位和发现问题，提高解决问题的效率。

全文检索

电商商品搜索、移动应用搜索、企业内部信息搜索等海量数据下的站内搜索服务是高效获取信息的必要途径，ES 拥有全文检索功能，对结构化和非结构化数据都有良好的支持，同时还提供了简单易用的 RESTful API 和各种语言的客户端，方便用户快速搭建稳定的搜索服务，整合到已有的业务框架中。

商业智能 BI

在数据驱动运营的行业背景下，电子商务、移动应用、广告媒体等业务都需要借助数据分析和数据挖掘来辅助商业决策，而规模庞大的业务数据对数据的统计分析带来了很大的挑战。ES 拥有结构化查询的能力，支持复杂的过滤和聚合统计功能，帮助客户对海量数据进行高效地个性化统计分析、发现问题与机会、辅助商业决策，让数据产生真正的价值。

能力与限制说明

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腾讯云 ES 是基于开源软件 Elasticsearch 开发的云上 PaaS 服务。通过腾讯云 ES 您可以快速搭建 Elasticsearch 集群服务，开发日志分析、数据搜索等应用。下面介绍产品能力和使用限制。

产品构成

腾讯云 ES 包含核心部件 Elasticsearch 集群和数据可视化分析工具 Kibana 两部分。数据采集和传输到 ES 集群的部分，您可以根据自己的业务需要，部署数据采集工具如 Beats、Logstash 或开发应用程序，将数据写入 ES 集群。

可选配置

节点规格

参数名称	CPU 核数	内存
ES.S1.SMALL2	1	2G
ES.S1.MEDIUM4	2	4G
ES.S1.MEDIUM8	2	8G
ES.S1.LARGE16	4	16G
ES.S1.2XLARGE32	8	32G
ES.S1.4XLARGE32	16	32G
ES.S1.4XLARGE64	16	64G

其中1核2G仅为测试用，不建议用于生产环境。

存储

SSD 云盘，单个节点，磁盘大小限制为100GB - 6TB。

节点个数

节点个数限制为2 - 50。由于 ES 集群常以分布式多节点的形式构成，因此需要有主节点对集群进行统一的管理。为了防止可能的节点故障导致脑裂问题，建议您至少选择3个节点构建集群。

配置选择

可参考最佳实践文档的 [集群规格和容量配置评估](#)。

网络访问

VPC 内网访问

为了保证数据的安全，腾讯云 ES 构建在用户 VPC 内，也只能通过 VPC 访问集群进行数据的写入和查询。如果您需要通过公网访问 ES 集群，进行开发调试，可以通过 [VPN 连接](#) 的方式，打通本地 IDC 和云上 VPC，或通过 [外网代理的形式](#)。同时也提醒您做好数据安全防护。

Kibana 页面

支持通过公网访问 Kibana 页面，为了保证数据安全，Kibana 页面需要设置密码和访问 IP 黑白名单。

VPC 网络选择

腾讯云 ES 创建完成后，不支持切换 VPC 网络，请在创建集群时，提前规划业务部署。

相关概念

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Elasticsearch 集群一般是由多个节点共同组成的分布式集群，节点之间互通，彼此配合，共同对外提供搜索和索引服务（节点之间能够将客户端请求转向到合适的节点）。不同的节点会负责不同的角色，有的负责一个，有的可能负责多个。Elasticsearch 中有多个节点角色，其中有两个比较主要的是数据节点和主节点。

数据节点（Data Node）

主要承担了数据存储和数据处理的工作，保存索引分片，处理与数据相关的操作，例如 CRUD、搜索、聚合等各种 I/O、内存和 CPU 密集型操作。集群使用过程中，需要注意监控数据节点的资源使用率，并在服务过载时通过添加更多的数据节点，进行集群扩容，以保障集群的稳定性。

主节点（Master Node）

负责轻量化整个集群范围内的操作，例如创建或删除索引、跟踪哪些节点是集群的一部分以及决定将哪些分片分配给哪些节点。对于集群健康来说，拥有一个稳定的主节点非常重要。

备选主节点（Master-eligible node）

指有资格被选为主节点的节点，任何符合主节点条件的节点（默认情况下为所有节点）都可以通过主选择过程被选为主节点。

默认情况下，所有节点都是数据节点，也都是备选主节点，对于小型集群来说非常方便。由于数据节点处理索引和搜索数据的请求都是 I/O、内存和 CPU 密集型工作，可能对节点的资源造成压力。随着集群的增长，为了确保主节点稳定且不受压力，保障集群的稳定，需将主节点和数据节点分离。

专用主节点（Dedicated Master Node）

指 Elasticsearch 集群中，设置了只能作为主节点的节点。

专用主节点配置建议

设置专用主节点主要是为了保障集群增大时的稳定性，建议专用主节点个数至少为3个。

- 专用主节点个数为1：只有1个备选主节点，`discovery.zen.minimum_master_nodes` 设置为1，网络发生故障时缺少备份。
- 专用主节点个数为2：有2个备选主节点，`minimum_master_nodes` 设置为1，有备份节点，但网络发生故障，在重新选主时，有发生脑裂的风险（每个备选主节点都将自己设置为主节点）；`minimum_master_nodes` 设置为2，发生故障时，可选主节点个数达不到要求，不能选出主节点。
- 专用主节点个数为3：有3个备选主节点，`discovery.zen.minimum_master_nodes` 设置为2，网络发生故障时，丢失一个可选主节点，在重新选主时，能有效选出主节点。

其他详细说明，可参考 [ES 节点说明](#)。