

Assignment 10

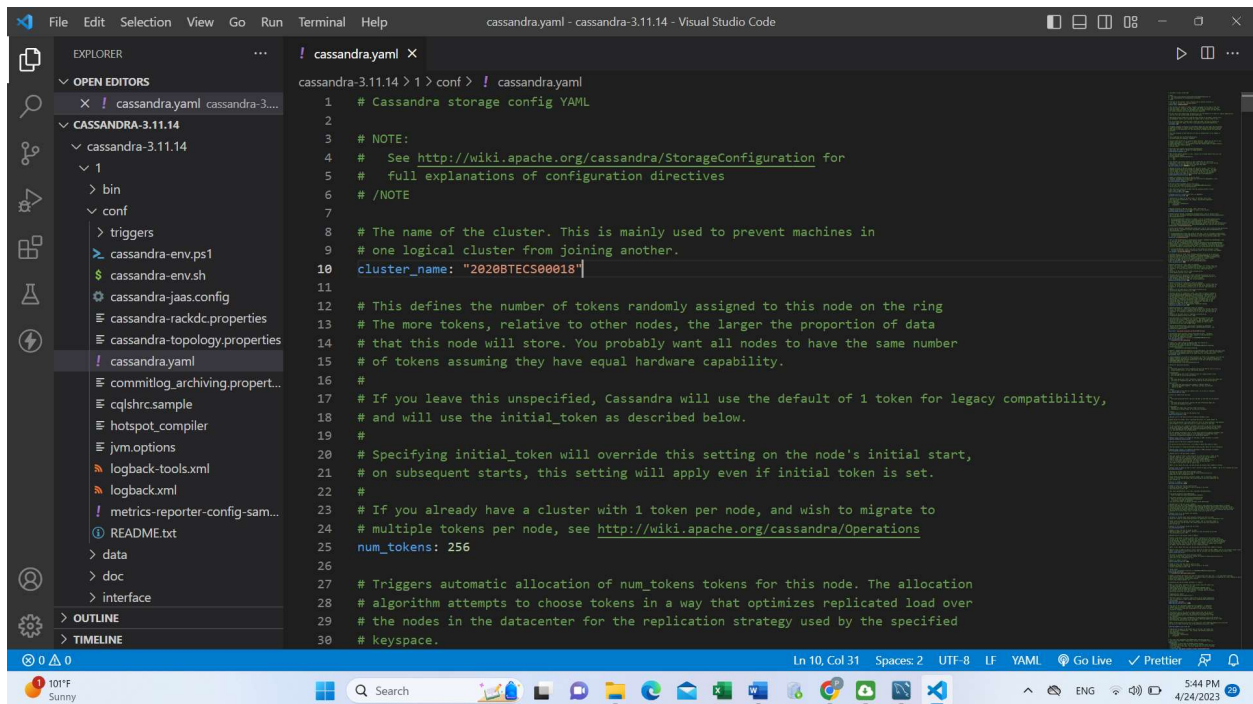
Advanced Database System Lab

Name: Prajakta Sandeep Chavan.

PRN: 2020BTECS00018.

Batch: T1.

Name Cluster:



```
1 # Cassandra storage config YAML
2
3 # NOTE:
4 #   See http://wiki.apache.org/cassandra/StorageConfiguration for
5 #   full explanations of configuration directives
6 # /NOTE
7
8 # The name of the cluster. This is mainly used to prevent machines in
9 # one logical cluster from joining another.
10 cluster_name: "2020BTECS00018"
11
12 # This defines the number of tokens randomly assigned to this node on the ring
13 # The more tokens, relative to other nodes, the larger the proportion of data
14 # that this node will store. You probably want all nodes to have the same number
15 # of tokens assuming they have equal hardware capability.
16 #
17 # If you leave this unspecified, Cassandra will use the default of 1 token for legacy compatibility,
18 # and will use the initial_token as described below.
19 #
20 # Specifying initial_token will override this setting on the node's initial start,
21 # on subsequent starts, this setting will apply even if initial token is set.
22 #
23 # If you already have a cluster with 1 token per node, and wish to migrate to
24 # multiple tokens per node, see http://wiki.apache.org/cassandra/Operations
25 num_tokens: 256
26
27 # Triggers automatic allocation of num_tokens tokens for this node. The allocation
28 # algorithm attempts to choose tokens in a way that optimizes replicated load over
29 # the nodes in the datacenter for the replication strategy used by the specified
30 # keyspace.
```

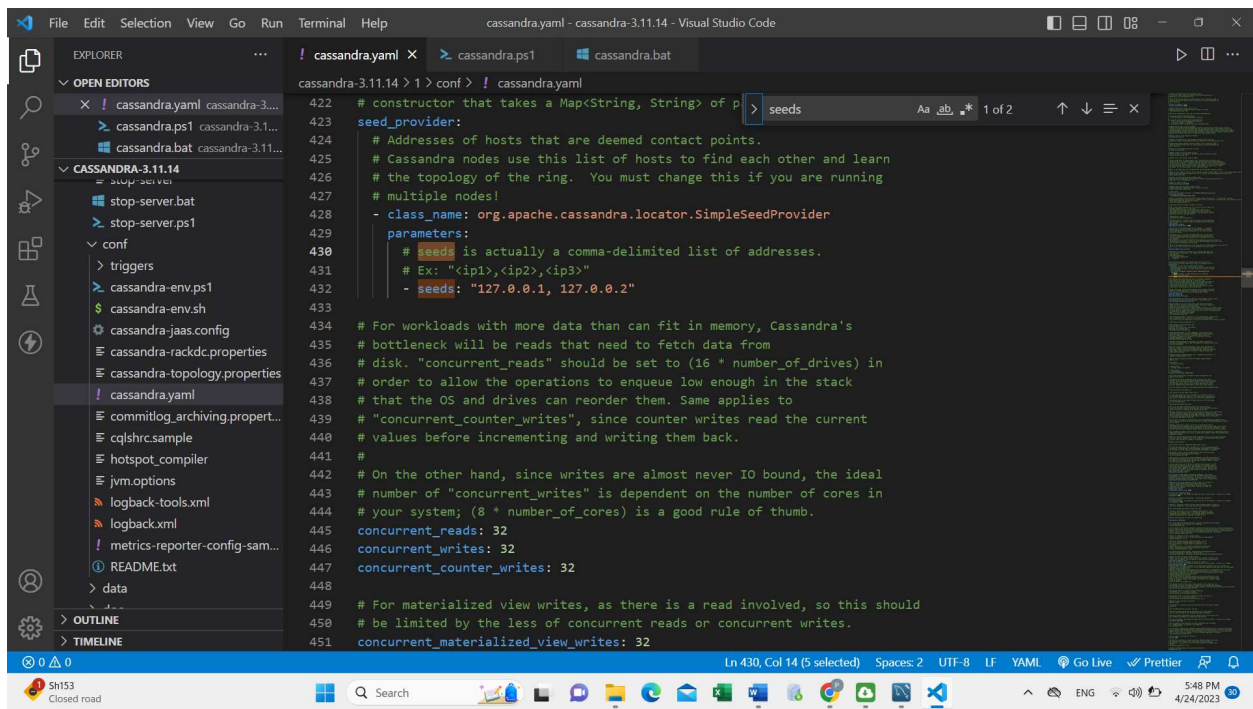
Comment VerifyPortsAreAvailable:

```
1 cassandra-3.11.14 > 1 > bin > > cassandra.ps1
2 # raise -D and -X JVM_OPTS
3
4 for ($i = 0; $i -lt $script:args.Length; ++$i)
5 {
6     if ($script:args[$i].StartsWith("-D") -Or $script:args[$i].StartsWith("-X"))
7     {
8         $env:JVM_OPTS = "$env:JVM_OPTS " + $script:args[$i]
9     }
10 }
11
12 if ($install -or $uninstall)
13 {
14     HandleInstallation
15 }
16 else
17 {
18     # VerifyPortsAreAvailable
19     RunCassandra($f)
20 }
21
22 -----
23 Function HandleInstallation
24 {
25     $SERVICE_JVM = ""cassandra""
26     $PATH_PRUNSRV = "$env:CASSANDRA_HOME\bin\daemon"
27     $PR_LOGPATH = $serverPath
28
29     if (-Not (Test-Path $PATH_PRUNSRV\prunsvr.exe))
30     {
31         Write-Warning "Cannot find $PATH_PRUNSRV\prunsvr.exe. Please download package from https://download
32     }
33 }
```

Port for 1st node is 7199:

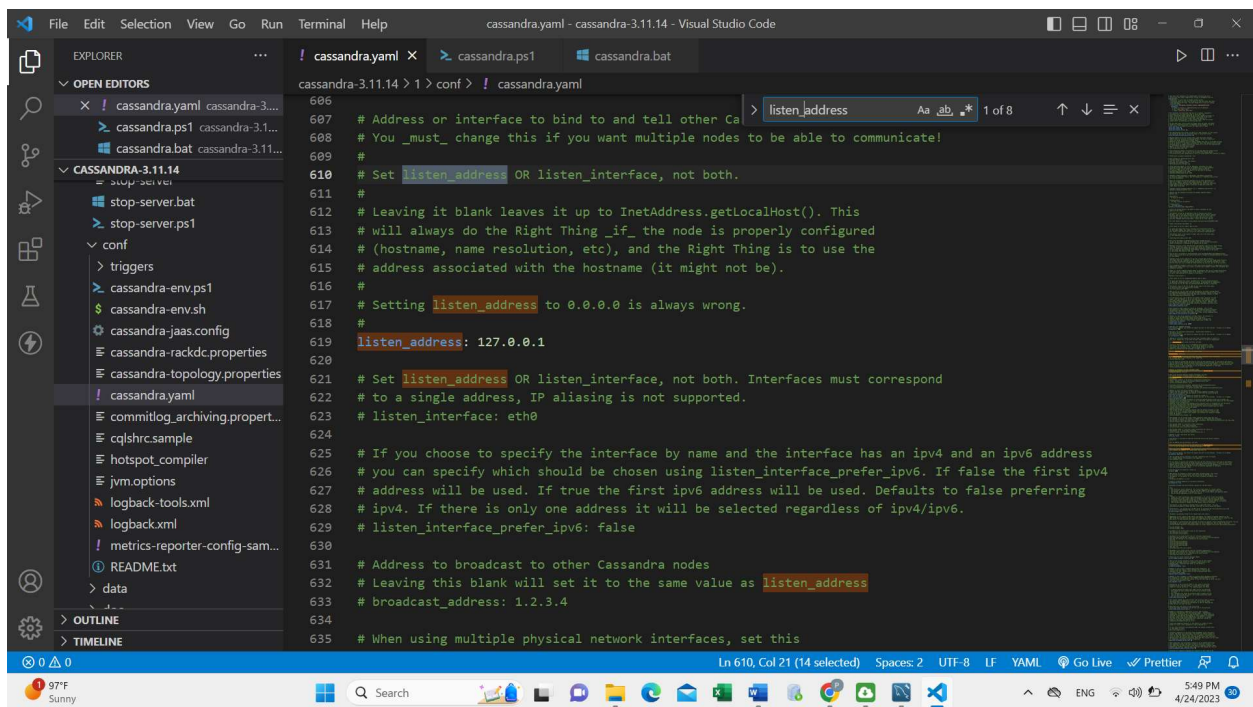
```
1 cassandra-3.11.14 > 1 > bin > cassandra.bat
2 REM JVM_OPTS we all use an legacy run on installation
3
4 set JAVA_OPTS=-ea^
5
6 -javaagent:"%CASSANDRA_HOME%\lib\jamm-0.3.0.jar"^
7
8 -Xms2G^
9
10 -Xmx2G^
11
12 -XX:+HeapDumpOnOutOfMemoryError^
13
14 -XX:+UseParNewGC^
15
16 -XX:+UseConcMarkSweepGC^
17
18 -XX:+CMSParallelRemarkEnabled^
19
20 -XX:SurvivorRatio=8^
21
22 -XX:MaxTenuringThreshold=1^
23
24 -XX:CMSInitiatingOccupancyFraction=75^
25
26 -XX:+UseCMSInitiatingOccupancyOnly^
27
28 -Dlogback.configurationFile=logback.xml^
29
30 -Djava.library.path="%CASSANDRA_HOME%\lib\sigar-bin"^
31
32 -Dcassandra.jmx.local.port=7199
33
34 REM *** JMX REMOTE ACCESS SETTINGS SEE: https://wiki.apache.org/cassandra/JmxSecurity ***
35
36 REM -Dcom.sun.management.jmxremote.port=7199^
37
38 REM -Dcom.sun.management.jmxremote.ssl=false^
39
40 REM -Dcom.sun.management.jmxremote.authenticate=true^
41
42 REM -Dcom.sun.management.jmxremote.password.file=C:\jmxremote.password
43
44
45
46
47 REM ***** CLASSPATH library setting *****
48 REM Ensure that any user defined CLASSPATH variables are not used on startup
49
50 set CLASSPATH="%CASSANDRA_HOME%\conf"
51
52
53 REM For each jar in the CASSANDRA_HOME lib directory call append to build the CLASSPATH variable.
54
55 for %%i in ("%CASSANDRA_HOME%\lib\*.jar") do call :append "%%i"
56
57 goto okClasspath
58
59 :append
60
61 set CLASSPATH=%CLASSPATH%;%%i
62
63 goto okClasspath
64
65 :okClasspath
```

Seeds : 127.0.0.1, 127.0.0.2



```
422 # constructor that takes a Map<String, String> of p
423 seed_provider:
424 # Addresses of hosts that are deemed contact points.
425 # Cassandra nodes use this list of hosts to find each other and learn
426 # the topology of the ring. You must change this if you are running
427 # multiple nodes!
428 - class_name: org.apache.cassandra.locator.SimpleSeedProvider
429   parameters:
430     # seeds is actually a comma-delimited list of addresses.
431     # Ex: "<ip1>,<ip2>,<ip3>"
432     - seeds: "127.0.0.1, 127.0.0.2"
433
434 # For workloads with more data than can fit in memory, Cassandra's
435 # bottleneck will be reads that need to fetch data from
436 # disk. "concurrent_reads" should be set to (16 * number_of_drives) in
437 # order to allow the operations to enqueue low enough in the stack
438 # that the OS and drives can reorder them. Same applies to
439 # "concurrent_counter_writes", since counter writes read the current
440 # values before incrementing and writing them back.
441 #
442 # On the other hand, since writes are almost never IO bound, the ideal
443 # number of "concurrent_writes" is dependent on the number of cores in
444 # your system; (8 * number_of_cores) is a good rule of thumb.
445 concurrent_reads: 32
446 concurrent_writes: 32
447 concurrent_counter_writes: 32
448
449 # For materialized view writes, as there is a read involved, so this should
450 # be limited by the less of concurrent reads or concurrent writes.
451 concurrent_materialized_view_writes: 32
```

Listen address for 1st node: 127.0.0.1



```
606
607 # Address or interface to bind to and tell other Ca
608 # You _must_ change this if you want multiple nodes to be able to communicate!
609 #
610 # Set listen_address OR listen_interface, not both.
611 #
612 # Leaving it blank leaves it up to InetAddress.getLocalHost(). This
613 # will always do the Right Thing _if_ the node is properly configured
614 # (hostname, name resolution, etc), and the Right Thing is to use the
615 # address associated with the hostname (it might not be).
616 #
617 # Setting listen_address to 0.0.0.0 is always wrong.
618 #
619 listen_address: 127.0.0.1
620
621 # Set listen_address OR listen_interface, not both. Interfaces must correspond
622 # to a single address, IP aliasing is not supported.
623 # listen_interface: eth0
624
625 # If you choose to specify the interface by name and the interface has an ipv4 and an ipv6 address
626 # you can specify which should be chosen using listen_interface_prefer_ipv6. If false the first ipv4
627 # address will be used. If true the first ipv6 address will be used. Defaults to false preferring
628 # ipv4. If there is only one address it will be selected regardless of ipv4/ipv6.
629 # listen_interface_prefer_ipv6: false
630
631 # Address to broadcast to other Cassandra nodes
632 # Leaving this blank will set it to the same value as listen_address
633 # broadcast_address: 1.2.3.4
634
635 # When using multiple physical network interfaces, set this
```

Rpc address of 1st node: 127.0.0.1

The screenshot shows the Visual Studio Code interface with the `cassandra.yaml` file open. The file is for Cassandra 3.11.14. The `rpc_address` is set to `127.0.0.1`. The file explorer on the left shows the project structure, including `stop-server.bat`, `stop-server.ps1`, `conf`, `triggers`, `cassandra-env.ps1`, `cassandra-env.sh`, `cassandra-jaas.config`, `cassandra-rackdc.properties`, `cassandra-topology.properties`, `! cassandra.yaml`, `commitlog_archiving.properties`, `cqlshrc.sample`, `hotspot_compiler`, `jvm.options`, `logback-tools.xml`, `logback.xml`, `metrics-reporter-config-sample.xml`, `README.txt`, `data`, `OUTLINE`, and `TIMELINE`.

```
682 start_rpc: false
683
684 # The address or interface to bind the Thrift RPC service and native transport
685 # server to.
686 #
687 # Set rpc_address OR rpc_interface, not both.
688 #
689 # Leaving rpc_address blank has the same effect as on listen_address
690 # (i.e. it will be based on the configured hostname of the node).
691 #
692 # Note that unlike listen_address, you can specify 0.0.0.0, but you must also
693 # set broadcast_rpc_address to a value other than 0.0.0.0.
694 #
695 # For security reasons, you should not expose this port to the internet. Firewall it if needed.
696 rpc_address: 127.0.0.1
697
698 # Set rpc_address OR rpc_interface, not both. Interfaces must correspond
699 # to a single address, IP aliasing is not supported.
700 # rpc_interface: eth1
701
702 # If you choose to specify the interface by name and the interface has an ipv4 and an ipv6 address
703 # you can specify which should be chosen using rpc_interface_prefer_ipv6. If false the first ipv4
704 # address will be used. If true the first ipv6 address will be used. Defaults to false preferring
705 # ipv4. If there is only one address it will be selected regardless of ipv4/ipv6.
706 # rpc_interface_prefer_ipv6: false
707
708 # port for Thrift to listen for clients on
709 rpc_port: 9160
710
711 # RPC address to broadcast to drivers and other Cassandra nodes. This cannot
```

\$JMX_PORT="7199"

The screenshot shows the Visual Studio Code interface with the `cassandra-env.ps1` file open. The file is for Cassandra 3.11.14. The `$JMX_PORT` is set to `7199`. The file explorer on the left shows the project structure, including `stop-server.bat`, `stop-server.ps1`, `conf`, `triggers`, `cassandra-env.ps1`, `cassandra-env.sh`, `cassandra-jaas.config`, `cassandra-rackdc.properties`, `cassandra-topology.properties`, `! cassandra.yaml`, `commitlog_archiving.properties`, `cqlshrc.sample`, `hotspot_compiler`, `jvm.options`, `logback-tools.xml`, `logback.xml`, `metrics-reporter-config-sample.xml`, `README.txt`, `data`, `OUTLINE`, and `TIMELINE`.

```
400 # $env:JVM_OPTS=$env:JVM_OPTS -XX:+CrashOnOutOfMemoryError
401 # $env:JVM_OPTS=$env:JVM_OPTS -XX:OnOutOfMemoryError="taskkill /F /PID %p"
402
403 # print an heap histogram on OutOfMemoryError
404 # $env:JVM_OPTS=$env:JVM_OPTS -Dcassandra.printHeapHistogramOnOutOfMemoryError=true
405
406 if ($env:JVM_VERSION.CompareTo("1.8.0") -eq -1 -or [convert]::ToInt32($env:JVM_PATCH_VERSION) -lt 40)
407 {
408     echo "Cassandra 3.0 and later require Java 8u40 or later."
409     exit
410 }
411
412 # Specifies the default port over which Cassandra will be available for
413 # JMX connections.
414 $JMX_PORT="7199"
415
416 # store in env to check if it's avail in verification
417 $env:JMX_PORT=$JMX_PORT
418
419 # Configure the following for JEMallocAllocator and if jemalloc is not available in the system
420 # library path.
421 # set LD_LIBRARY_PATH=<JEMALLOC_HOME>/lib/
422 # $env:JVM_OPTS=$env:JVM_OPTS -Djava.library.path=<JEMALLOC_HOME>/lib/"
423
424 # jmx: metrics and administration interface
425 #
426 # add this if you're having trouble connecting:
427 # $env:JVM_OPTS=$env:JVM_OPTS -Djava.rmi.server.hostname=<public name>"
428 #
```

Make some changes in the other 2 nodes.

Just following are node-specific changes.

2nd node:

Port for 2nd node is 7299:

Listen address for 2nd node: 127.0.0.2

Rpc address of 2nd node: 127.0.0.2

`$JMX_PORT="7299"`

3rd node:

Port for 3rd node is 7399:

Listen address for 3rd node: 127.0.0.3

Rpc address of 3rd node: 127.0.0.3

`$JMX_PORT="7399"`

Starting node 1:

```
C:\Windows\System32\cmd.exe - cassandra -f
Microsoft Windows [Version 10.0.19044.2846]
(c) Microsoft Corporation. All rights reserved.

C:\cassandra-3.11.14>bin\cassandra -f
WARNING! Powershell script execution unavailable.
Please use 'powershell Set-ExecutionPolicy Unrestricted'
on this user-account to run cassandra with fully featured
functionality on this platform.
Starting with legacy startup options
Starting Cassandra Server
INFO [main] 2023-04-24 11:38:33.296 YamConfigurationLoader.java:93 - Configuration location: file:/C:/cassandra-3.11.14/1/conf/cassandra.yaml
INFO [main] 2023-04-24 11:38:33.937 Config.java:555 - Node configuration:[allocate_tokens_for_keyspace=<REDACTED>; allow_extra_insecure_udfs=false; allow_insecure_udfs=false; authenticator=AllowAllAuthenticator; auth
orizer=AllowAllAuthorizer; auto_bootstrap=true; auto_snapshot=true; back_pressure.enabled=false; back_pressure.strategy=org.apache.cassandra.net.RateBasedBackPressure(high_ratio=0.9, factor=5, flow=FAST); batch
size_fall_threshold_in_kb=5; batch_size_max_threshold_in_kb=5; batchlog_replay_throttle_in_kb=1024; broadcast_address=null; broadcast_rpc_address=null; buffer_pool_use_heap_if_exhausted=true; cache_load_timeou
t_seconds=30; cas_contention_timeout_in_ms=1000; cdc_enabled=false; cdc_free_space_check_interval_ms=250; cdc_raw_directory=null; cdc_total_space_in_mb=0; check_for_duplicate_rows_during_compaction=true; check_f
or_duplicate_rows_during_read_repair; client_encryption_options=<REDACTED>; cluster_name=Test Cluster; column_index_cache_size_in_kb=2; column_index_size_in_kb=64; commit_failure_policy=stop; commitlog_compression
=null; commitlog_directory=null; commitlog_max_compression_buffers_in_pool=3; commitlog_periodic_queue_size=1; commitlog_segment_size_in_mb=32; commitlog_sync_period_in_ms=10000; commitlog_sync_batch_window_in_ms=80; c
ommitlog_sync_period_in_ms=10000; commitlog_total_space_in_mb=null; compaction_large_partition_warning_threshold_mb=100; compaction_throughput_mb_per_sec=16; concurrent_compactors=null; concurrent_counter_writes
=32; concurrent_materialized_view_reads=32; concurrent_reads=32; concurrent_replicates=null; concurrent_writes=32; counter_cache_keys_to_save=2147483647; counter_cache_save_period=7200; counter_cache_size_in_mb
=null; counter_write_request_timeout_in_ms=5000; credentials_cache_max_entries=1000; credentials_update_interval_in_ms=1; credentials_validity_in_ms=2000; cross_node_timeout=false; data_file_directories=[Ljava
.lang.String;@4fe767f3; disk_access_mode=auto; disk_failure_policy=stop; disk_optimization_estimate_percentile=0.95; disk_optimization_page_cross_chance=0.1; disk_optimization_strategy=s3; dynamic_snitch=true; d
ynamic_snitch_badness_threshold=0.1; dynamic_snitch_reset_interval_in_ms=600000; dynamic_snitch_update_interval_in_ms=100; enable_drop_compact_storage=false; enable_materialized_views=true; enable_ssl_indexes=t
rue; enable_scripted_user_defined_functions=false; enable_user_defined_functions=false; enable_user_defined_functions_threads=true; encryption_options=<REDACTED>; endpoint_snitch=SimpleSnitch; file_cache_round_u
p=null; file_cache_size_in_mb=null; force_new_prepared_statement_behaviour=false; gc_log_threshold_in_ms=200; gc_warn_threshold_in_ms=1000; hinted_handoff_disabled_datacenters=[]; hinted_handoff_enabled=true; hi
nted_handoff_throttle_in_kb=1024; hints_compression=null; hints_directory=null; hints_flush_period_in_ms=10000; incremental_backups=false; index_interval=null; index_summary_capacity_in_mb=null; index_summary_re
size_interval_in_minutes=60; initial_token=null; inter_dc_stream_throughput_outbound_megabits_per_sec=200; inter_dc_tcp_nodelay=false; internode_compression=snappy; internode_recv_buff
er_size_in_bytes=0; internode_send_buffer_size_in_mb=null; ip_tos=null; java_optimizations=null; key_cache_keys_to_save=2147483647; key_cache_save_period=1000; key_cache_size_in_mb=null; listen_address=127.0.0.1; listen_interface=null; listen_interface
_prefer_ipv6=false; listen_on_broadcast_address=false; max_hint_window_in_ms=10800000; max_hints_delivery_threads=2; max_hints_file_size_in_mb=128; max_mutation_size_in_kb=null; max_streaming_retries=3; max_value
_size_in_mb=250; memtable_allocation_type=heap_buffers; memtable_cleanup_threshold=null; memtable_flush_writers=0; memtable_heap_space_in_mb=null; memtable_offheap_space_in_mb=null; min_free_space_per_drive_in_m
b=50; native_transport_flush_in_batches_legacy=true; native_transport_max_concurrent_connections=1; native_transport_max_concurrent_connections_per_ip=1; native_transport_max_concurrent_requests_in_bytes=1; n
ative_transport_max_concurrent_requests_in_bytes_per_ip=1; native_transport_max_frame_size_in_mb=256; native_transport_max_negotiable_protocol_version=2147483648; native_transport_max_threads=128; native_tran
sport_port=9042; native_transport_port_ssl=null; num_tokens=256; otc_backlog_expiration_interval_ms=200; otc_coalescing_enough_coalesced_messages=8; otc_coalescing_strategy=DISEMBLED; otc_coalescing_window_us=200;
partitioner=org.apache.cassandra.dht.Murmur3Partitioner; permissions_cache_max_entries=1000; permissions_update_interval_in_ms=1; permissions_validity_in_ms=2000; phi_convict_threshold=0.0; prepared_statements
_cache_size_mb=null; range_request_timeout_in_ms=10000; read_request_timeout_in_ms=10000; repair_session_max_tree_depth=18; request_scheduler=org.apache.cassandra.scheduler.NoScheduler; request_scheduler_id=null;
request_scheduler_options=null; request_timeout_in_ms=10000; role_manager=CassandraRoleManager; roles_cache_max_entries=1000; roles_update_interval_in_ms=1; roles_validity_in_ms=2000; row_cache_size_name=org.
apache.cassandra.cache.OHCProvider; row_cache_keys_to_save=2147483647; row_cache_save_period=60; row_cache_size_in_mb=0; rpc_address=127.0.0.1; rpc_interface=null; rpc_interface_prefer_ipv6=false; rpc_keepalive=
true; rpc_listen_backlog=50; rpc_max_threads=2147483647; rpc_min_threads=16; rpc_port=9160; rpc_recv_buff_size_in_bytes=null; rpc_send_buff_size_in_bytes=null; rpc_server_type=sync; saved_caches_directory=null; s
eed_provider=org.apache.cassandra.locator.SimpleSeedProvider(seeds=127.0.0.1, 127.0.0.2); server_encryption_options=<REDACTED>; slow_query_log_timeout_in_ms=500; snapshot_before_compaction=false; snapshot_on_du
plicate_row_detection=false; ssl_storage_port=7001; sslable_preemptive_op_interval_in_ms=50; start_native_transport=true; start_rpc=false; storage_port=7000; stream_throughput_outbound_megabits_per_sec=200; str
eaming_keep_alive_period_in_secs=300; streaming_socket_timeout_in_ms=86400000; thrift_framed_transport_size_in_mb=16; thrift_max_message_length_in_mb=16; thrift_prepared_statements_cache_size_mb=null; tombston
e_failure_threshold=10000; tombstone_warn_threshold=100; tracetype_query=1; tracetype_query_plan=0; tracetype_repair=1; tracetype_repair_plan=0; transport_data_encryption_options=org.apache.cassandra.config.TransparentDataEncryptionOptions2;
trickle_fsync=false; trickle_fsync_interval_in_kb=10240; truncate_cache_timeout_in_ms=60000; unlogged_batch_cross_partitions_warn_threshold=10; user_defined_function_fail_timeout=1500; user_defined_f
unction_warn_timeout=500; user_function_timeout_policy=die; windows_timer_interval=1; write_request_timeout_in_ms=2000]
INFO [main] 2023-04-24 11:38:33.938 DatabaseDescriptor.java:381 - DiskAccessMode 'auto' determined to be mmap, indexAccessMode is mmap
INFO [main] 2023-04-24 11:38:33.943 DatabaseDescriptor.java:430 - Global memtable on-heap threshold is enabled at 4096B
INFO [main] 2023-04-24 11:38:33.945 DatabaseDescriptor.java:443 - Global memtable off-heap threshold is enabled at 4096B
INFO [main] 2023-04-24 11:38:34.132 RateBasedBackPressure.java:123 - Initialized back-pressure with high ratio: 0.9, factor: 5, flow: FAST, window size: 2000.
INFO [main] 2023-04-24 11:38:34.133 DatabaseDescriptor.java:781 - Back-pressure is disabled with transport.org.apache.cassandra.net.RateBasedBackPressure(high_ratio=0.9, factor=5, flow=FAST).
INFO [main] 2023-04-24 11:38:34.278 JMXServerUtils.java:253 - Configured JMX server at: service:jmx:rmi://127.0.0.1/jndi/rmi://127.0.0.1:7199/jmxrmi
INFO [main] 2023-04-24 11:38:34.291 CassandraDaemon.java:490 - Hostname: LAPTOP-PLGHE3E
```

Node 1 started

```
Select C:\Windows\System32\cmd.exe - cassandra -f
INFO [main] 2023-04-24 11:39:10.241 tokenMetadata.java:507 - Updating topology for /127.0.0.1
INFO [main] 2023-04-24 11:39:10.285 StorageService.java:1104 - Using saved tokens [-1088273674822217781, -1101564000062457189, -1298151023691724928, -1544863911924741599, -1596148760871118970, -1598461075663991
549, -160799041576260888, -1721370337230152434, -174970557829401433, -1789034990265434641, -1849433216231417348, -185714789155682868, -195580298627861835, -2270936697689643805, -2276224062761179716, -22944152
429399762, -2311059955238234245, -234621346565313258, -2352313270543408112, -2415246183441405569, -2430219245094472374, -2453364297758124743, -2503108906005308751, -2585502715298904598, -2678305315291794592,
-271462329266524330, -2779176409232013661, -2887714592451716888, -296582484311911123, -321947070361188043, -3281727512984761288, -3373340480968504073, -341362081794198155, -354359460524
2958231, -35790722325224446, -361322093893226406, -36711361148370987, -370570407039921292, -3771109384037225, -381845706901707109, -385461347544093099, -38790388096064425, -388
5719658680586, -409119978387032809, -409777575858568279, -4103071324830680786, -415175865939773707, -418518941213723054, -4316135014934576017, -4393251997182359009, -441093421403060605, -44126687403781236
46, -4602483742000199261, -4654831352368430735, -472573734106466136, -4740738406265536197, -4813962137420303873, -4933708700172244925, -503496208289240317, -5079292767418885463, -511893160396832371, -523788815
9003271708, -5260342309562361294, -529467818365264762, -5347640613892142320, -5445234655503926763, -5449736812965091307, -5538996122303914298, -5556632028435221440, -5620995154399534227, -564042895743775273, -5
66087407836781861, -5691465685381946411, -5670483950657077075, -570693851925128705, -5830152155940827, -5929034610122072759, -6043346109907497, -6146334409568880160, -6231563245188972312, -62951229630211
6693, -6270007520802485574, -630134097107272107, -630198317901833943, -635936515722222991, -6419061842243479114, -6422073867070213382, -654036977415335983, -654185121761057750, -655081952934046657, -6573472
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783075552906020, -7072417538767290368, -710506568624674227, -71384016387792533, -715597786014833054, -7356010043051048700, -736603356619568580, -744840629564837578, -747086920634577916, -75809136589118575
7, -76137693444384582, -7706677700104398010, -7826188756274495995, -799544304531013376, -8008723319775607303, -8014899195649870722, -8017694509235796575, -802484204288241083, -8181736049522274952, -8183424428
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8514929645899125, -900281517548371991, -9017260309910356400, -920328037618758071, -9284263690313552400, -931877538880633786, -1200030003409185568, -125758038118310842, -130619940596650535, -1407166232865207275,
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-20061620439671464, -2039150239558864791, -21832160872163959, -219699896645119511, -2270704729513473709, -2312947055626843786, -2338673635732384944, -2386579923584440821, -2439431434368942391, -244392275983941809, -247
683843663767616, -260595925720240206, -257562522119635078, -2601305157952973171, -2658591367289651562, -271216447491080841, -2789820884387113612, -3076419993136404679, -326613157078638611, -3388444164432223656, -3451
268154009565224, -3475110093303029523, -3493144093257501177, -3561490740010260123, -3569240408859925731, -362957546700909894, -362613274199042637, -376468728572828080, -384082175913212154, -397137433193304723, -4128
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656345366719808484, -866759554324203136, -869297682156234047, -8719253486980257722, -871926891599711179, -8737309385901195538, -8777329043529279870, -8832376110713277556, -8910422787983086657, -894945658843102957, -907
339923962516241, -9077345136198544206, -9080887914319910557, -915016611871912745]
INFO [main] 2023-04-24 11:39:10.313 StorageService.java:1568 - JOINING: Finish joining ring
INFO [main] 2023-04-24 11:39:10.417 StorageService.java:2484 - Node /127.0.0.1 state jump to NORMAL
INFO [main] 2023-04-24 11:39:10.702 NativeTransportService.java:73 - Netty using Java NIO event loop
INFO [main] 2023-04-24 11:39:10.796 Server.java:158 - Using Netty Version: [netty-buffer-netty-buffer-4.0.44.Final, 452812a, netty-codec-netty-codec-4.0.44.Final, 452812a, netty-codec-haproxy-netty-codec-haproxy-
4.0.44.Final, 452812a, netty-codec-http-netty-codec-http-4.0.44.Final, 452812a, netty-codec-socks-netty-codec-socks-4.0.44.Final, 452812a, netty-common-netty-common-4.0.44.Final, 452812a, netty-handler-netty-handler-
4.0.44.Final, 452812a, netty-tcnative-netty-tcnative-1.1.33.Fork2-1.42cbb, netty-transport-netty-transport-4.0.44.Final, 452812a, netty-transport-native-epoll-netty-transport-native-epoll-4.0.44.Final, 452812a, n
etty-transport-rxtx-netty-transport-rxtx-4.0.44.Final, 452812a, netty-transport-sctp-netty-transport-sctp-4.0.44.Final, 452812a, netty-transport-udt-netty-transport-udt-4.0.44.Final, 452812a]
INFO [main] 2023-04-24 11:39:10.796 Server.java:159 - Starting listening for CQL clients on /127.0.0.1:9042 (unencrypted)...
INFO [main] 2023-04-24 11:39:11.005 CassandraDaemon.java:564 - Not starting RPC server as requested. Use JMX (StorageService->startRPCServer()) or nodetool (enablethrift) to start it
INFO [main] 2023-04-24 11:39:11.005 CassandraDaemon.java:650 - Startup complete
```


Starting node 2:

```
C:\Windows\System32\cmd.exe - cassandra -f
Microsoft Windows [Version 10.0.19044.2846]
(c) Microsoft Corporation. All rights reserved.

C:\cassandra-3.11.14\2\bin>cassandra -f
WARNING! Powershell script execution unavailable.
Please use 'powershell Set-ExecutionPolicy Unrestricted'
on this user-account to run cassandra with fully featured
functionality on this platform.
Starting with legacy startup options
Starting Cassandra Server
INFO [main] 2023-04-24 11:42:38,582 YamlConfigurationLoader.java:93 - Configuration location: file:/C:/cassandra-3.11.14/2/conf/cassandra.yaml
INFO [main] 2023-04-24 11:42:39,521 Config.java:555 - Node configuration:[allocate_tokens_for_keyspace=null; allow_extra_insecure_udfs=false; allow_insecure_udfs=false; authenticator=AllowAllAuthenticator; authorizer=AllowAllAuthorizer; auto_bootstrap=true; auto_snapshot=true; back_pressure_enabled=false; back_pressure_strategy=org.apache.cassandra.net.RateBasedBackPressure(high_ratio=0.9, factor=5, flow=FAST); batch_size_fail_threshold_in_kb=50; batch_size_warn_threshold_in_kb=50; batchlog_replay_throttle_in_kb=1024; broadcast_address=null; broadcast_rpc_address=null; buffer_pool_use_heap_if_exhausted=true; cache_load_timeout_seconds=30; cas_contention_timeout_in_ms=1000; cdc_enabled=false; cdc_free_space_check_interval_ms=250; cdc_row_directory=null; cdc_total_space_in_mb=0; check_for_duplicate_rows_during_compaction=true; check_for_duplicate_rows_during_reads=true; client_encryption_options=REDACTED; cluster_name=Test Cluster; column_index_cache_size_in_kb=2; column_index_size_in_kb=64; commit_failure_policy=stop; commitlog_compression=null; commitlog_directory=null; commitlog_max_compression_buffers_in_pool=3; commitlog_periodic_queue_size=1; commitlog_segment_size_in_mb=32; commitlog_sync=periodic; commitlog_sync_batch_window_in_ms=null; commitlog_sync_period_in_ms=10000; commitlog_total_space_in_mb=null; compaction_large_partition_warning_threshold_mb=100; compaction_throughput_mb_per_sec=16; concurrent_compactors=null; concurrent_counter_writes=32; concurrent_materialized_view_writes=32; concurrent_reads=32; concurrent_replicates=null; concurrent_writes=32; counter_cache_keys_to_save=2147483647; counter_cache_size_in_mb=null; counter_write_request_timeout_in_ms=5000; credentials_cache_max_entries=1000; credentials_update_interval_in_ms=1; credentials_validity_in_ms=2000; cross_node_timeout=false; data_file_directories=[Ljava.lang.String;@4fe767f3]; disk_access_mode=auto; disk_failure_policy=stop; disk_optimization_estimate_percentile=0.95; disk_optimization_page_cross_chance=0.1; disk_optimization_strategy=ssd; dynamic_snitch=true; dynamic_snitch_badness_threshold=0.1; dynamic_snitch_reset_interval_in_ms=600000; dynamic_snitch_update_interval_in_ms=100; enable_drop_compact_storages=false; enable_materialized_views=true; enable_sasi_indexes=true; enable_scripted_user_defined_functions=false; enable_user_defined_functions_threads=true; encryption_options=REDACTED; endpoint_snitch=SimpleSnitch; file_cache_round_robin=null; file_cache_size_in_mb=null; force_new_prepared_statement_behaviour=false; gc_log_threshold_in_ms=200; gc_warn_threshold_in_ms=1000; hinted_handoff_disabled_datacenters=[]; hinted_handoff_enabled=true; hinted_handoff_throttle_in_kb=1024; hints_compression=null; hints_directory=null; hints_flush_period_in_ms=10000; incremental_backups=false; index_interval=null; index_summary_capacity_in_mb=null; index_summary_resize_interval_in_minutes=60; initial_token=null; inter_dc_stream_throughput_outbound_megabits_per_sec=200; inter_dc_tcp_nodelay=false; internode_compression=dc; internode_recv_buffer_size_in_bytes=0; internode_send_buffer_size_in_bytes=0; key_cache_keys_to_save=2147483647; key_cache_save_period=14400; key_cache_size_in_mb=null; listen_address=127.0.0.2; listen_interface=null; listen_interface_prefer_ipv6=false; listen_on_broadcast_address=false; max_hint_window_in_ms=10800000; max_hints_delivery_threads=2; max_hints_file_size_in_mb=128; max_mutation_size_in_kb=null; max_streaming_retries=3; max_value_size_in_mb=256; memtable_allocation_type=heap_buffers; memtable_cleanup_threshold=null; memtable_flush_writers=0; memtable_heap_space_in_mb=null; memtable_offheap_space_in_mb=null; mem_free_space_per_drive_in_mb=50; native_transport_flush_in_batches_legacy=true; native_transport_max_concurrent_connections=1; native_transport_max_concurrent_connections_per_ip=1; native_transport_max_concurrent_requests_in_bytes=1; native_transport_max_concurrent_requests_in_bytes_per_ip=1; native_transport_max_frame_size_in_mb=256; native_transport_max_negotiable_protocol_version=2147483648; native_transport_max_threads=128; native_transport_port=9042; native_transport_port_ssl=null; num_tokens=256; otc_backlog_expiration_interval_ms=200; otc_coalescing_enough_coalesced_messages=8; otc_coalescing_strategy=DISABLED; otc_coalescing_window_us=200; partitioner=org.apache.cassandra.dht.Murmur3Partitioner; permissions_cache_max_entries=1000; permissions_update_interval_in_ms=1; permissions_validity_in_ms=2000; phi_convict_threshold=0.0; prepared_statements_cache_size_mb=null; range_request_timeout_in_ms=10000; read_request_timeout_in_ms=5000; repair_session_max_tree_depth=18; request_scheduler=org.apache.cassandra.scheduler.NoScheduler; request_scheduler_id=null; request_scheduler_options=null; request_timeout_in_ms=10000; role_manager=CassandraRoleManager; roles_cache_max_entries=1000; roles_update_interval_in_ms=1; roles_validity_in_ms=2000; row_cache_class_name=org.apache.cassandra.cache.OHCProvider; row_cache_keys_to_save=2147483647; row_cache_save_period=0; row_cache_size_in_mb=0; rpc_address=127.0.0.2; rpc_interface=null; rpc_interface_prefer_ipv6=false; rpc_keepalive=true; rpc_listen_backlog=50; rpc_max_threads=2147483647; rpc_min_threads=16; rpc_port=9160; rpc_recv_buffer_size_in_bytes=null; rpc_send_buffer_size_in_bytes=null; rpc_server_type=sync; saved_caches_directory=null; seed_provider=org.apache.cassandra.locator.SimpleSeedProvider(seeds=127.0.0.1, /127.0.0.2); server_encryption_options=REDACTED; slow_query_log_timeout_in_ms=500; snapshot_before_compaction=false; snapshot_on_duplicate_row_detection=false; ssl_storage_port=7001; sstable_preemptive_open_interval_in_mb=50; start_native_transport=true; start_rpc=false; storage_port=7000; stream_throughput_outbound_megabits_per_sec=200; stream_keep_alive_period_in_secs=300; streaming_socket_timeout_in_ms=86400000; thrift_framed_transport_size_in_mb=15; thrift_max_message_length_in_mb=16; thrift_prepared_statements_cache_size_mb=null; tombstone_failure_threshold=100000; tombstone_warn_threshold=1000; tracetype_query_ttl=86400; tracetype_repair_ttl=604800; transparent_data_encryption_options=org.apache.cassandra.config.TransparentDataEncryptionOptions$None; trickle_fsync=false; trickle_fsync_interval_in_kb=10240; truncate_request_timeout_in_ms=60000; unlogged_batch_cross_partitions_warn_threshold=10; user_defined_function_fail_timeout=1500; user_defined_function_warn_timeout=500; user_function_timeout_policy=fix; windows_timer_interval=1; write_request_timeout_in_ms=2000]
INFO [main] 2023-04-24 11:42:39,523 DatabaseDescriptor.java:381 - DiskAccessMode 'auto' determined to be mmap, indexAccessMode is mmap
INFO [main] 2023-04-24 11:42:39,529 DatabaseDescriptor.java:439 - Global memtable on-heap threshold is enabled at 495MB
INFO [main] 2023-04-24 11:42:39,530 DatabaseDescriptor.java:443 - Global memtable off-heap threshold is enabled at 495MB
INFO [main] 2023-04-24 11:42:39,785 RateBasedBackPressure.java:123 - Initialized back-pressure with high ratios: 0.9, factor: 5, flow: FAST, window size: 2000.
INFO [main] 2023-04-24 11:42:39,786 DatabaseDescriptor.java:781 - Back-pressure is disabled with strategy org.apache.cassandra.net.RateBasedBackPressure(high_ratio=0.9, factor=5, flow=FAST).
INFO [main] 2023-04-24 11:42:39,979 JMXServerUtils.java:253 - Configured JMX server at: service:jmx:rmi:///127.0.0.1/jndi/rmi://127.0.0.1:7299/jmxrmi
INFO [main] 2023-04-24 11:42:39,990 CassandraDaemon.java:490 - Hostname: LAPTOP-PL6NE83E
```

Node 2 started:

```
INFO [main] 2023-04-24 11:47:11,232 QueryProcessor.java:174 - Preloaded 0 prepared statements
INFO [main] 2023-04-24 11:47:11,235 StorageService.java:699 - Cassandra version: 3.11.14
INFO [main] 2023-04-24 11:47:11,237 StorageService.java:700 - Thrift API version: 20.1.0
INFO [main] 2023-04-24 11:47:11,246 StorageService.java:701 - CQL supported versions: 3.4.4 (default: 3.4.4)
INFO [main] 2023-04-24 11:47:11,247 StorageService.java:703 - Native protocol supported versions: 3/v3, 4/v4, 5/v5-beta (default: 4/v4)
INFO [main] 2023-04-24 11:47:11,321 IndexSummaryManager.java:87 - Initializing index summary manager with a memory pool size of 99 MB and a resize interval of 60 minutes
INFO [main] 2023-04-24 11:47:11,642 MessagingService.java:750 - Starting Messaging Service on /127.0.0.2:7000
INFO [main] 2023-04-24 11:47:11,697 OutboundTcpConnection.java:108 - OutboundTcpConnection using coalescing strategy DISABLED
INFO [HANDSHAKE-/127.0.0.1] 2023-04-24 11:47:11,722 OutboundTcpConnection.java:561 - Handshaking version with /127.0.0.1
```

Node 3 started:

```
INFO [main] 2023-04-24 12:19:40,769 StorageService.java:1568 - JOINING: Finish joining ring
INFO [main] 2023-04-24 12:19:40,864 Gossiper.java:1869 - Waiting for gossip to settle...
INFO [main] 2023-04-24 12:19:48,866 Gossiper.java:1900 - No gossip backlog; proceeding
INFO [main] 2023-04-24 12:19:49,125 NativeTransportService.java:73 - Netty using Java NIO event loop
INFO [main] 2023-04-24 12:19:49,217 Server.java:158 - Using Netty Version: [netty-buffer=netty-buffer-4.0.44.Final.452812a, netty-codec=netty-codec-4.0.44.Final.452812a, netty-codec-haproxy=netty-codec-haproxy-4.0.44.Final.452812a, netty-codec-http=netty-codec-http-4.0.44.Final.452812a, netty-codec-socks=netty-codec-socks-4.0.44.Final.452812a, netty-common=netty-common-4.0.44.Final.452812a, netty-handler=netty-handler-4.0.44.Final.452812a, netty-tcnative=netty-tcnative-1.1.3.Fork26.142ecbb, netty-transport=netty-transport-4.0.44.Final.452812a, netty-transport-native-epoll=netty-transport-native-epoll-4.0.44.Final.452812a, netty-transport-rxtx=netty-transport-rxtx-4.0.44.Final.452812a, netty-transport-sctp=netty-transport-sctp-4.0.44.Final.452812a, netty-transport-udt=netty-transport-udt-4.0.44.Final.452812a]
INFO [main] 2023-04-24 12:19:49,218 Server.java:159 - Starting listening for CQL clients on /127.0.0.3:9042 (unencrypted)
INFO [main] 2023-04-24 12:19:49,415 CassandraDaemon.java:564 - Not starting RPC server as requested. Use JMX (StorageService->startRPCServer()) or nodetool (enablethrift) to start it
INFO [main] 2023-04-24 12:19:49,415 CassandraDaemon.java:650 - Startup complete
```

3 Node cluster formed:

```
C:\cassandra-3.11.14\1\bin>nodetool status
```

```
Datacenter: datacenter1
```

```
=====
```

```
Status=Up/Down
```

```
|/ State=Normal/Leaving/Joining/Moving
```

--	Address	Load	Tokens	Owns (effective)	Host ID	Rack
UN	127.0.0.1	76.01 KiB	256	65.6%	47395b58-e7ad-42a4-9bd8-bff541e6f51c	rack1
UN	127.0.0.2	70.95 KiB	256	69.4%	3adcad71-f600-44bc-8541-6cc0fcf1d1e9	rack1
UN	127.0.0.3	70.94 KiB	256	65.0%	476c5b61-685f-499d-9e31-4daf8e5f0d8c	rack1