

Nextra Tuning Guide

Version 1.1



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Chapter 1 Introduction

Nextra μ RPC provides the maximum performance over TCP/IP layer while not giving up RAS (Reliability, Availability and Scalability) through its TCP/IP runtime library.

μ RPC is a next generation of RPC which promises you to experience an ultra high speed RPC; 1 transaction < 1 millisecond. The ultra high speed RPC is materialized with a new feature MTTT¹ armored with Fail-over, Load Balancing and Monitoring standard built-in features.

You shall consider 3 areas: 1) Nextra, 2) TCP layer and 3) others, to tune up your applications in order gain the maximum performance through provided parameters. Now let's see those 3 areas step by step.

¹ HTT = Multi Threading Technology

Chapter 2 Through Nextra

Nextra provides on the fly runtime setup parameters for your applications through its environment variables and environment file attributes.

Environment file attributes

The following through Nextra environment files (.env).

| Variables | OS | Default | Client /Server | Explanation |
|-------------------------|-----|--------------|----------------|--|
| DCE_ASYNC_CLENAUP_DEALY | All | 3600 seconds | Both | Interval for each thread resource to be cleaned up. For Client, it is only valid when using along with Asynchronous RPC |
| DCE_CLN_TIMEOUT | All | INT_MAX | Client | The value, <i>duration</i> , for this attribute specifies the number of seconds that a client will wait for the return of a RPC sent by a server. |
| DCE_CONNECTION_TIMEOUT | All | 5 seconds | Client | <p>The value, <i>duration</i>, for this attribute specifies the number of seconds that a client will wait for the return of confirmation RPC sent by a server. If the client did not get the response within the duration seconds, then the client will close the connection to the server process and try to connect to other server processes if available.</p> <p>This attribute is effective for quickly detecting server machine down and routing to other available server processes running on different machines.</p> <p>However, we do NOT recommend you to set 0 that leads to an unexpected result.</p> |
| DCE_CONNRETRY | All | 1 | Client | The number of connection retry |

| Variables | OS | Default | Client /Server | Explanation |
|--------------------------------|-----|-----------------|----------------------------|--|
| | | | | attempt if the client socket detects an error/exception. |
| DCE_LISTEN_QUEUES | All | 5 | Server | TCP backlog queue |
| DCE_PACKETSIZE4NOFRAGMENT | All | 0 | Both, expect Object client | When the data comprising 1 RPC is bigger than the size defined with DCE_PACKETSIZE environment file attribute, you may improve the speed to send the all data at once by setting DCE_PACKET4NOFRAGMENT environment file attribute to 1. |
| DCE_PACKETSIZE | All | 1,460 bytes | Both | <p>Network packet size. The client and server both need to be in the same size. Please set this value bigger if your application deals many times with larger data than the default size (1460 bytes) so that you will experience the speed up in the data transfer.</p> <p>You can come up with the suitable value for your computing environment with the following formula:</p> <p>MSS = MTU - TCP header(20bytes) - IP header(20bytes)</p> |
| DCE_SO_LINGER | All | 10 milliseconds | Server | Controls whether or not an application "lingers" (waits) if there are untransmitted data in the send socket buffer when the socket is closed. |
| DCE_SO_RCVBUF_LEN ² | All | OS depend | Both | Receive buffer window size (bytes) |

² Consider to set this variable whenever you see EWOULDBLOCK system error in your Nextra server log file.

| Variables | OS | Default | Client /Server | Explanation |
|---------------------------|---------------------|-----------|----------------|---|
| DCE_SO_SNDBUF_LEN | All | OS depend | Both | Send buffer window size (bytes) |
| DCE_SVR_TIMEOUT | All | INT_MAX | Server | The value, duration, for this attribute specifies the number of seconds that a server will remain idle waiting for an RPC after a client has connected to it. |
| DCE_TCP_NODELAY | Windows / some Unix | 0 | Both | Setting 1 to this environment file attribute disables the Nagle algorithm. |
| DCE_THREADED ³ | All | 1,024 | Both | Max Thread per process |
| DCE_THREAD_LOCK_TIMEOUT | All | 5 seconds | Both | The number of seconds that Asynchronous RPC call and threaded server will wait at the critical sections. |

Please refer to “Chapter 2 File Specifications” of Reference for the further explanations as to the environment file attributes.

³ Alternative for the high performance required server process would be DCE_DEDICATED; let it fork off a process, not a thread for each client request. The feature is called as Dedicated server.

Chapter 3 Through TCP layer

| Parameter name | OS | Via | Default | Recommendation |
|------------------------|-------------------|-----------------------|-----------|----------------|
| MaxUserPort | Windows | Registry ⁴ | 5,000 | > 5,000 |
| TcpTimedWaitDelay | Windows | The same as above. | 240 | 30 |
| tcp_time_wait_interval | Unix | ndd /dev/tcp | OS depend | 6,000 |
| tcp_ip_abort_interval | Unix | ndd /dev/tcp | OS depend | 60,000 |
| tcp_keepalive_interval | Unix | ndd /dev/tcp | OS depend | 900,000 |
| tcp_fin_wait_2_timeout | HP-UX | ndd /dev/tcp | OS depend | 600,000 |
| tcp_rcv_hiwat_def | HP-UX | ndd /dev/tcp | OS depend | 32,768 |
| tcp_rcv_hiwat | Solaris/ Linux | ndd /dev/tcp | OS depend | 32,768 |

⁴ HKEY_LOCAL_MACHINE\SYSTEM\CurrentControlSet\Services\Tcpip\Parameters

Chapter 4 Through others

Avoid excessive file I/O and debug info logging

First off, please consider to avoid excessive file I/O in your program. Secondly, Nextra provides a logging feature which you can specify the level in the environment file attribute: DCE_DEBUGLEVEL. If you set “NONE, NONE”, then there is NO Nextra log will be written off in the log file. However, it is NOT a realistic approach in the mission critical applications. You shall specify “NONE, DEBUG” or “WARN, DEBUG” in your mission critical applications. Please refer to “Chapter 2 File Specifications” of *Reference manual* for the further explanations as to DCE_DEBUGLEVEL environment file attribute.

Avoid using mounted drive

We recommend you to run your applications off on your local file system. Furthermore, please never consider to use a mounted directory/file system to write off logs in the real mission critical applications.

Having enough RAM in order to avoid swap out

Speaking itself.

Network

Key elements for better performance would be window size, bandwidth, QoS, data throughput, connect time, stability and so on.

Security

Remember that tightening the security level may slow your application performance.

Chapter 5 Footnote

We quickly summarized mainly focused on Nextra and its influential areas. There are other areas you or your administrator can check and tune through devices or OS parameters with provided manuals. We here give you some useful information which we recommend you read through first.

Nextra manual

Please refer to *Configuration Guide* and *Reference*.

Tuning TCP/IP parameters through OS

HP-UX

<http://docs.hp.com/en/B3921-60631/ndd.1M.html>

Solaris

<http://docs.sun.com/app/docs/doc/819-3681/6n5srhhrb?l=ja&a=view>

AIX

http://publib16.boulder.ibm.com/pseries/en_US/aixbman/prftungd/prftungd.htm

Windows

<http://www.microsoft.com/windowsserver2003/evaluation/performance/default.mspx>

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