

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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