Natural RPC Version 5.1.1

The Natural Remote Procedure Call is available as a separate subcomponent of Natural and has its own version. The version of the Remote Procedure Call is oriented at the version of Natural on Windows and UNIX. This measure takes into account that the Natural Remote Procedure Call is a cross-platform component and makes it possible to provide new Natural RPC versions independent of new Natural versions for the various platforms supported.

Part of the RPC functionality provided with Natural Version 4.1 for Mainframes had already been delivered with Natural Version 3.1.6 as optional features.

The following new product features, changes and enhancements are provided with Version 5.1.1 of Natural Remote Procedure Call.

New Features:

- Support of Large and Dynamic Alpha and Binary Variables
- Maximum Length for Node and Server Names Increased to 32 Characters
- Support of the EntireX Broker ACI V6
- Support of SSL for the TCP/IP Communication
- Support of EntireX Location Transparency
- New Application Programming Interface USR2035N
- New Application Programming Interface USR2073N
- New User Exit NATRPC99
- Support of Natural Security Logon without Valid Password
- Enhanced Verification of the Natural Security User ID
- Prerequisites

Enhanced Features:

- Support of Multiple EntireX Broker Logons (USR2071N)
- Enhancements to Application Programming Interfaces
- Enhancements to Status Function RPCINFO

SYSRPC Utility Enhancements and Modifications:

- Generation of Service Directory (NATCLTGS) in User Library
- Support of Long Node and Server Names
- Support of EntireX Location Transparency
- New Properties for Local Directory
- Generation of Stubs in User Library
- Removal of 32K Restriction for Stubs
- Preserving Attribute Definitions of Existing Stubs
- Attribute Definitions as Comment in DEFINE DATA PARAMETER
- Support of Natural Security Utility Profiles

Changed Features:

- Implicit END TRANSACTION in a Conversation
- Release of Adabas Retain Sets
- Reworked Sample USR1071P
- Changes to RPCERR
- Changes to the Error Messages of Server
- Changes to PIng and TErminate Messages
- Service Directory (NATCLTGS) in User Library

- Generation of Stubs in User Library
- Changes/Enhancements to Profile Parameter RPC
- RPCSIZE Considerations

Unsupported Features:

- Optional Parameters

New Features

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Support of Large and Dynamic Alpha and Binary Variables

With Natural RPC Version 5.1.1, large alpha/binary and dynamic alpha/binary formats are supported in the parameter list of a remote CALLNAT execution. In case of dynamic alpha or binary variables, the remote CALLNAT on the server may increase or decrease the size of the dynamic variables received. Only the size currently used is sent back to the client.

Dynamic alpha and binary variables are only supported with automatic RPC execution, that is without using Natural RPC stubs.

In the case of dynamic alpha and binary variables, the client uses the value of the Natural RPC profile parameter MAXBUFF for the receive buffer length passed to the EntireX Broker stubs. If Entire Net-work is used as transport layer and the Natural profile parameter ACIVERS is set to 3 or above, the value for MAXBUFF must not exceed 30.

Note:
Large and dynamic variables must only be used by a Natural RPC client if they are also supported by the corresponding RPC server. If large and dynamic variables are sent to an RPC server that does not support them, the RPC server will reject the request.

Maximum Length for Node and Server Names Increased to 32 Characters

With Natural RPC Version 5.1.1, the maximum length for node and server name has been increased to 32 characters to be compliant with the EntireX Broker ACI. This enhancement allows you to specify a fully qualified TCP/IP node name and makes the etc/hosts and etc/services definitions obsolete.

Neither the interface nor the internal structure of the local directory NATCLTGS has been changed. See also Support Long Node and Server Names below.

Support of the EntireX Broker ACI V6

The Natural RPC profile parameter ACIVERS has been enhanced to enable you to specify Version 6.

The specification of ACI Version 6 is strongly recommended if you are using the TCP/IP stub EXAAPSC (CICS only) to enable Natural to use the TERMINATE option for the LOGOFF from the EntireX Broker.

Note:
The EntireX Broker stub in use must support the API version specified with ACIVERS. For the supported API versions, refer to the EntireX documentation.

Support of SSL for the TCP/IP Communication

Secure Socket Layer (SSL) support for the TCP/IP communication to the EntireX Broker has been introduced. To enable the EntireX Broker stub to recognize that the TCP/IP communication should use SSL, you have to use one of the following methods:

- Append the string :SSL to the node name.
- Prefix the node name with the string SSL://

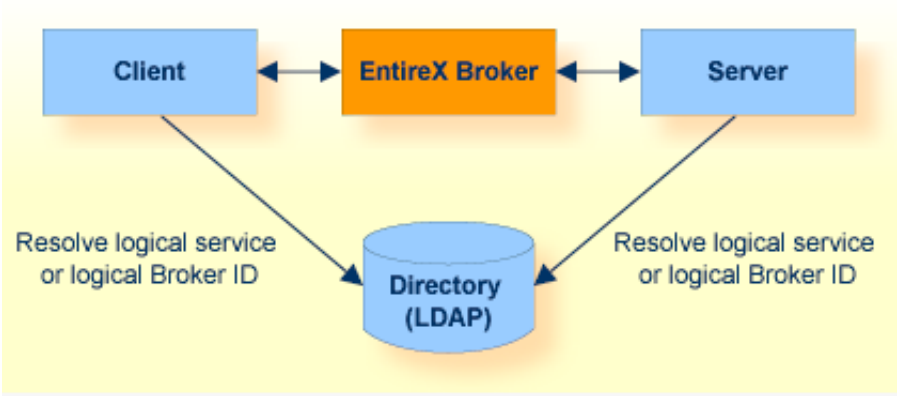
To use SSL, an SSL parameter string must be passed to the EntireX Broker stub on the very first call. For this purpose, the new application programming interface USR2035N has been provided.

For more details about SSL and the SSL parameter string, see the EntireX documentation.

Note:
The EntireX broker stub EXAAPSB or EXAAPSC must be used for this feature.

Support of EntireX Location Transparency

With EntireX, location transparency is possible. Instead of using the physical node name and the physical server name, a server can be addressed by a logical name. This makes the location of the EntireX Broker and the name of the server transparent to clients and servers. The logical name is mapped to the physical node and server names by the EntireX Broker stub before it is used the first time.



For more details about the EntireX Location Transparency, see the EntireX documentation.

To take advantage of location transparency, the Natural RPC has been enabled to accept a logical name wherever only a physical node and a physical server name could be specified before.

The maximum length of a logical name is 192 characters. To avoid new Natural profile parameters, a logical name is specified in the server name and node name part of the existing parameters. There are two kinds of logical names:

- **Logical node names**
  With a logical node name, you specify a logical name for a node only in conjunction with a physical server name.
- **Logical services**
  With a logical service, you specify a logical name for both the node and the server. To define a logical service, the node name has to be set to *, and the server name contains the logical service name.

The following components refer to node and server names:

- The keyword parameters SRVNODE, SRVNAME, DFS and RDS of the NTRPC macro for static specification, or the subparameters with the same name of the profile parameter RPC.
- Service maintenance of the SYSRPC utility
- Service directory (NATCLTGS)
- Application Programming Interfaces USR2007N, USR2071N
- Service programs RPCERR, RPCINFO

The new information about logical service names is stored in the local directory NATCLTGS without changing its interface or its internal structure. All information is stored as attribute/ value pairs and the logical service names are just added under a new attribute.

To support existing callers, the interface to USR2007N and USR20071N has not been changed. To be able to retrieve or specify long logical service names, the respective internal PDA fields have been defined with the VALUE RESULT option and their length has been increased.

Note:
The EntireX broker stub EXAAPSB or EXAAPSC must be used for this feature. In addition a directory service is required.

New Application Programming Interface USR2035N

For the support of the Secure Socket Layer (SSL) communication, the new application programming interface USR2035N is provided to set the required SSL parameter string. USR2035N must be called before the first remote procedure call is executed on the client side, or before the Natural RPC server logs on to the EntireX Broker.

New Application Programming Interface USR2073N

For the support of pinging and terminating a Natural RPC server from within a Natural program, the new application programming interface USR2073N is provided.

New User Exit NATRPC99

An optional user exit named NATRPC99 has been provided to support customer-specific termination logic for a Natural RPC server. NATRPC99 is called after the Natural RPC server has deregistered and logged off from the server node. If no NATRPC99 is found, the server terminates immediately as usual. If a Natural program with name NATRPC99 is found, the server continues to run as a normal Natural session and NATRPC99 is called with a FETCH statement.

Support of Natural Security Logon without Valid Password

The interface between the Natural RPC server and Natural Security (NSC) has been enhanced to support a client logon without a valid password. The client has to generate the logon data as before but the password must not be a valid NSC password for the user. This feature is similar to the automatic logon (AUTO=ON) for local Natural sessions.

For details see the NSC documentation about the Natural RPC session parameters.

Enhanced Verification of the Natural Security User ID

The interface between the Natural RPC server and Natural Security (NSC) has been enhanced to support the verification of the Natural user ID of the client versus the EntireX user ID used by the client to logon to the EntireX broker. This enhanced verification is especially useful if the NSC logon is done without a valid password (see above) and the EntireX Broker logon has been validated by a security system.

For details, see the NSC documentation about the Natural RPC session parameters.

Prerequisites

- EntireX Broker stubs EXAAPSB/EXAAPSC (which require SMARTS) if you want to use SSL and/or location transparency.
- Directory services if you want to use location transparency.

For details on the EntireX Broker stubs and their SMARTS requirement, see the EntireX documentation.

Enhanced Features

- Support of Multiple EntireX Broker Logons (USR2071N)
- Enhancements to Application Programming Interfaces
- Enhancements to Status Function RPCINFO

Support of Multiple EntireX Broker Logons (USR2071N)

The application programming interface USR2071N has been enhanced to allow you to log on to multiple EntireX Brokers concurrently. That is, if you have already issued a logon to an EntireX Broker, a logon to a new EntireX Broker no longer implies a logoff from the current one.

Enhancements to Application Programming Interfaces

To support long node and server names, the application programming interfaces USR2007N and USR2071N have been enhanced to accept and return node and server names having a length of up to 192 characters. Existing callers who are using 8-character-long names will still work and need not be adapted.

Enhancements to Status Function RPCINFO

To support long node and server names, the RPCINFO subprogram has been enhanced to return the up to 32 character long physical node and server names. Existing callers, which use 8 character long names will still work and need not be adapted. For compatibility reasons, the RPCINFOL local data area still uses 8-character-long node and server names.

SYSRPC Utility Enhancements and Modifications

With Natural RPC Version 5.1.1, the following changes and enhancements have been made to the Natural SYSRPC utility:

- Generation of Service Directory (NATCLTGS) in User Library
- Support of Long Node and Server Names
- Support of EntireX Location Transparency
- New Properties for Local Directory
- Generation of Stubs in User Library
- Removal of 32K Restriction for Stubs
- Preserving Attribute Definitions of Existing Stubs
- Attribute Definitions as Comment in DEFINE DATA PARAMETER
- Support of Natural Security Utility Profiles

A short description of these changes and enhancements is given below. For more details, refer to the SYSRPC utility documentation.

Generation of Service Directory (NATCLTGS) in User Library

The generated service directory (subprogram NATCLTGS) is stored in the current user library. For this reason, you are recommended to LOGON to the application library (or one of its STEPLIBs) used by the client at runtime before you invoke the SYSRPC utility.

Support of Long Node and Server Names

To be compliant with the EntireX Broker, the Service Directory Maintenance function enables you to specify node and server names of up to 32 characters. The editing functions of the Service Directory Maintenance function have been adapted accordingly.

Support of EntireX Location Transparency

To support the EntireX Location Transparency, the Service Directory Maintenance function enables you to specify logical node names and logical services of up to 192 characters. The editing functions of the Service Directory Maintenance function have been adapted accordingly.

New Properties for Local Directory

The property "transport protocol" has been added, which makes the Natural profile parameter ACIPATT obsolete.

The RDS specific properties "expiration time" and "unique directory identifier" are integrated into the local directory using appropriate attributes.

Generation of Stubs in User Library

The generated stubs are stored in the current user library. For this reason, you are recommended to LOGON to the application library (or one of its STEPLIBs) used by the client at runtime before you invoke the SYSRPC utility.

Removal of 32K Restriction for Stubs

The length restriction of 32 KB for the data exchanged between client and server has been removed. It is now possible to generate stubs, which send/receive up to 1 GB of data.

In addition, the stub generation will display the required length for the send and receive buffer. This will help the administrator to adjust the EntireX Broker attribute file definitions that are related to the message length.

For information about the EntireX Broker attribute file definitions, see the EntireX documentation.

Preserving Attribute Definitions of Existing Stubs

If an existing stub is regenerated (e.g. to add or delete parameters), the Attribute fields on the stub generation screen are preset with the attribut definitions that were assigned to the parameters when the stub was last generated. Therefore, you are no longer required to re-enter the attribute definitions.

Attribute Definitions as Comment in DEFINE DATA PARAMETER

For better readability, the attribut definitions that have been assigned to the parameters on the stub generation screen are added as comment in the DEFINE DATA PARAMETER area.

Support of Natural Security Utility Profiles

The use of the various functions of the SYSRPC utility can be controlled by Natural Security utility profiles. For information about protecting utilities, see the Natural Security documentation.

Changed Features

- Implicit END TRANSACTION in a Conversation
- Release of Adabas Retain Sets
- Reworked Sample USR1071P
- Changes to RPCERR
- Changes to the Error Messages of the Server
- Changes to PIng and TErminate Messages
- Service Directory (NATCLTGS) in User Library
- Generation of Stubs in User Library
- Changes/Enhancements to Profile Parameter RPC
- RPCSIZE Considerations

Implicit END TRANSACTION in a Conversation

If ETEOP=ON had been set on the Natural RPC server side in previous Natural RPC versions, an implicit END TRANSACTION statement had been issued at the end of the execution of each remote subprogram. This may have lead to inconsistent data in the database if a conversation had been established which should be rolled back as part of the database transaction, but the modifications were already committed.

With Natural RPC Version 5.1.1, ETEOP=ON has no effect on the conversation, that is, no implicit END TRANSACTION is issued inside a conversation.

An implicit END TRANSACTION is still executed after execution of the last remote CALLNAT of a conversation, if ETEOP=ON is specified.

Release of Adabas Retain Sets

At the end of a non-conversation CALLNAT and at the end of a conversation, a RELEASE SETS is issued to release all Adabas retain sets. This ensures that the next request (which may be for a different client) will not see the data.

Reworked Sample USR1071P

The prime usage of the application programming interface USR1071N is to set a user ID and password that is passed to the RPC server with a following RPC request. The reworked sample program USR1071P on the library SYSEXT reflects this fact and only accepts user ID and password. The original version of USR1071P has been renamed to USR1071X. It provides extended functionality that in addition enables the setting and/or retrieval of various data.

Changes to RPCERR

To support long node and server names, the RPCERR program shows the up to 32 character long physical node and server names. The display window has been adapted accordingly.

Changes to the Error Messages of the Server

Error messages that are detected by the Natural RPC server before the remote CALLNAT is executed and that are directly caused by the remote CALLNAT (e.g. security violations, incompatible data format), are reported with the program name of the remote CALLNAT and the virtual line number 9999.

Changes to PIng and TErminate Messages

The PIng and TErminate messages have been enhanced and indicate that there is a Natural RPC server (in contrast to an EntireX RPC server) and the operating system where the Natural RPC server is running.

Service Directory (NATCLTGS) in User Library

The service directory (subprogram NATCLTGS) is no longer generated into the library SYRPC but into the current user library. If you want to generate NATCLTGS in the library SYSRPC, you must first LOGON to the library SYSRPC before invoking the SYSRPC utility.

Note:
It is strongly recommended that you generate NATCLTGS in the user library and leave the library SYSRPC on the FNAT unchanged.

Generation of Stubs in User Library

The stubs are no longer generated into the library SYRPC but into the current user library. If you want to generate a stub in the library SYSRPC, you must first LOGON to the library SYSRPC before invoking the SYSRPC utility.

Note:
It is strongly recommended that you generate the stubs in the user library and leave the library SYSRPC on the FNAT unchanged.

Changes/Enhancements to Profile Parameter RPC

The following changes/enhancements have been made to the Natural profile parameter RPC:

The following RPC subparameter has been dropped:

RPC Subparameter	Purpose/Reason
ACIPATT	Define Node Pattern for ACI Protocol This subparameter has become obsolete since ACI is the only supported transport method.

The following RPC subparameters have been enhanced:

RPC Subparameter	Enhancement
DFS	The range of possible values for *server name* and *server node* has been extended to 192 characters.
MAXBUFF	The range of possible values has been extended to 2097147 KB.
RPCSIZE	The range of possible values has been extended to 2097151 KB.
SRVNAME	The range of possible values has been extended to 192 characters.
SRVNODE	The range of possible values has been extended to 192 characters.

RPCSIZE Considerations

The new Natural RPC requires about 1 KB more working storage in the (client and server) settings of the RPCSIZE profile parameter that determines the size of the buffer used by the Natural RPC.

Depending on your environment, you may have to increase the RPCSIZE accordingly.

Unsupported Features

Optional Parameters

Optional parameters (*nX* notation in the CALLNAT statement) are not yet supported in the parameter list of a remote CALLNAT execution. This support will be provided with the forthcoming Natural RPC 6.1 version.

