

Ninf Roll: Users Guide



Version 4.1 Edition



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Preface

Ninf-G is developed by the National Institute of Advanced Industrial Science and Technology (AIST) and National Institute of Informatics (NII) in Japan. The Ninf-G official website can be found at ninf.apgrid.org¹, and includes complete user and programmer documentation in both English and Japanese. Ninf-G is a Remote Procedure Call (RPC) implementation for use on Globus-based Grids. The API implemented within Ninf-G is a reference implementation of the proposed GGF GridRPC API standard. GridRPC adapts effectively to wide variety of applications and it is especially suitable for developing general and scalable task-parallel applications. Ninf-G includes both C and Java APIs for client programming, an Interface Description Language (IDL) compiler for stub generation, and several commands for system management and utilization.

Ninf-G originated from the Ninf system, released by Ninf project at the Electrotechnical Laboratory in 1996. Development of Ninf-G was started in 2000 and it has been designed to work with basic Grid services, such as GSI, Pre-WS GRAM, and MDS in the Globus Toolkit. Ninf-G provides a simple, yet powerful, client-server-based standard RPC mechanism, plus asynchronous, coarse-grained parallel tasking frameworks for programming on a Grid, while hiding the complexity of using these services from application programmers. Ninf-G is currently used as key middleware several Grid projects including: Pacific Rim Applications and Grid Middleware Assembly (PRAGMA), Asia Pacific Partnership for Grid Computing (ApGrid), Application developments in TeraGrid, and Grid Superscaler.

Notes

1. <http://ninf.apgrid.org>

Chapter 1. Requirements

1.1. Rocks Version

The Ninf Roll is for use with Rocks version 4.1 (Fuji).

1.2. Required Rolls

- Base
- Grid (provides Globus 2.4)
- HPC
- Kernel
- OS

1.3. Incompatible Rolls

There are no known conflicts between this Roll and other Rocks Rolls.

Chapter 2. Installing the Ninf Roll

The Ninf Roll must be installed during the Frontend installation step of your cluster (refer to section 1.2 of the Rocks usersguide). Future releases will allow the installation of the Ninf Roll onto a running system. There are no other steps required to configure Ninf-G.

Chapter 3. Using the Ninf Roll

3.1. Prerequisites

In order to run an Ninf-G application you must have a Globus certificate and have initialized your Globus proxy. The Grid Roll documentation explains in detail how to obtain a certificate and verify the local host Globus installation. If you already have a certificate you may obtain a proxy certificate by running `grid-proxy-init` as shown below.

```
$ grid-proxy-init
Your identity: /O=Grid/OU=San Diego Supercomputer Center/OU=rocks12.sdsc.edu/OU=sdsc.edu/CN=Spaceman
Enter GRID pass phrase for this identity:
Creating proxy ..... Done
Your proxy is valid until: Tue Sep  9 10:53:51 2003
```

3.2. Running Sample Code

Ninf-G contains some sample applications which you can use to both test your installation and get started learning how to write Ninf-G code. In order to run these examples you must first copy the source code into your home directory. Please follow the steps in the below example to create a `ng-samples` directory at the top of your home directory. In addition to copying the sample code to your home directory all of the Ninf-G `client.conf` files are re-written to specify local host as the RPC server machine.

```
$ cd /opt/ng/test/samples/
$ make
if [ ! -d /home/mjk/ng-samples ]; then \
    mkdir -p /home/mjk/ng-samples; \
fi
cp -pR pi pi_mpi add /home/mjk/ng-samples
for d in pi pi_mpi add; do \
    cd /home/mjk/ng-samples/$d; \
    sed -e s%example.org%\`bin/hostname`\% client.conf > x; \
    mv x client.conf; \
    cd ..; \
done

$ cd ~/ng-samples
$ ls
add pi pi_mpi
```

A good example to begin with is the `pi` application (similar to the MPICH `pi` sample code). Running `make` will create a `pi_client` application which can then be used to test Grid RPC on the local machine through the loopback interface. Please refer to the Ninf-G documentation for how to run this across multiple machines.

```

$ cd ~/ng-samples/pi

$ ls
client.conf  Makefile  pi_client.c  pi.idl  pi_trial.c

$ make
[mjk@rocks-39 pi]$ make
/opt/ng/bin/ng_cc -g -o pi_client pi_client.c

cc -Wall -O2 -I/opt/ng/include -DNG_CPU_I386 -DNG_OS_LINUX -DPLAT_LINUX
-DNGI_ARCHITECTURE_ID=12 -D_FILE_OFFSET_BITS=64 -D__USE_FIXED_PROTOTYPE
S__ -I/opt/ng/include -I/opt/nmi/include -I/opt/nmi/include/gcc32 -g -o
pi_client pi_client.c -L/opt/ng/lib -lnggrpc -lngclient -lngcommon -ln
gnet -lngutility -lexpat -L/opt/nmi/lib -L/opt/nmi/lib -lglobus_gram_cl
ient_gcc32 -lglobus_gass_server_ez_gcc32 -lglobus_gram_protocol_gcc32 -
lglobus_gass_transfer_gcc32 -lglobus_io_gcc32 -lglobus_gss_assist_gcc32
 -lglobus_gssapi_gsi_gcc32 -lglobus_gsi_proxy_core_gcc32 -lglobus_gsi_c
redential_gcc32 -lglobus_gsi_callback_gcc32 -lglobus_oldgaa_gcc32 -lglo
bus_gsi_sysconfig_gcc32 -lglobus_gsi_cert_utils_gcc32 -lglobus_openssl_
gcc32 -lldap_gcc32 -llber_gcc32 -llutil_gcc32 -lglobus_proxy_ssl_gcc32
 -lglobus_openssl_error_gcc32 -lsasl_gcc32 -lssl_gcc32 -lcrypto_gcc32 -l
ltdl_gcc32 -lglobus_common_gcc32 -lm -lz -lm
/opt/ng/bin/ng_gen pi.idl
make -f pi.mak
make[1]: Entering directory `/home/mjk/ng-samples/pi'
cc -DNG_CPU_I386 -DNG_OS_LINUX -DPLAT_LINUX -DNGI_ARCHITECTURE_ID=12 -D
_FILE_OFFSET_BITS=64 -D__USE_FIXED_PROTOTYPES__ -I/opt/ng/include
-I/opt/nmi/include -I/opt/nmi/include/gcc32 -c _stub_pi_trial.c
cc -DNG_CPU_I386 -DNG_OS_LINUX -DPLAT_LINUX -DNGI_ARCHITECTURE_ID=12 -D
_FILE_OFFSET_BITS=64 -D__USE_FIXED_PROTOTYPES__ -I/opt/ng/include
-I/opt/nmi/include -I/opt/nmi/include/gcc32 -c pi_trial.c
cc -o _stub_pi_trial _stub_pi_trial.o -L/opt/ng/lib -lngexecutable -l
ngcommon -lngnet -lngutility -Wl,-R/opt/nmi/lib -L/opt/ng/lib -lexpat
-L/opt/nmi/lib -L/opt/nmi/lib -lglobus_gass_copy_gcc32 -lglobus_ftp_cl
ient_gcc32 -lglobus_gass_transfer_gcc32 -lglobus_ftp_control_gcc32 -lgl
obus_io_gcc32 -lglobus_gss_assist_gcc32 -lglobus_gssapi_gsi_gcc32 -lglo
bus_gsi_proxy_core_gcc32 -lglobus_gsi_credential_gcc32 -lglobus_gsi_cal
back_gcc32 -lglobus_oldgaa_gcc32 -lglobus_gsi_sysconfig_gcc32 -lglobus
_gsi_cert_utils_gcc32 -lglobus_openssl_gcc32 -lglobus_proxy_ssl_gcc32 -
lglobus_openssl_error_gcc32 -lssl_gcc32 -lcrypto_gcc32 -lglobus_common_
gcc32 -lm -lz pi_trial.o
./_stub_pi_trial -i _stub_pi_trial.inf
/opt/ng/bin/ng_gen_dif _stub_pi_trial

$ ./pi_client 10000000 `/bin/hostname`
counter = 7852825, times = 10000000
PI = 3.141130

```


Chapter 4. Copyrights

4.1. Ninf-G

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