
```
R " " "Node manager
```

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```
Author : Anders Andersen
Created On : Mon Aug 24 00:09:36 1998
Last Modified By: Anders Andersen
Last Modified On: Fri Sep 10 13:35:11 1999
Status : Unknown, Use with caution!
```

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This module implements the node manager. There is only one node manager on each node (host), and its main purpose is to provide communication ports to capsules and bindings.

The node manager is either started as a stand alone python program or automatically by a capsule (this is done if the capsule can not detect a node manager on the node it is running). The node manager will serve requests (normally requests for communication ports) until it receives a terminate command.

If the node manager module is loaded in another program, a node manager proxy is created and it is used to access the services of the running node manager (nm).

The node manager provides (through a node manager proxy) the following services: (i) `ping` is used to test if the actual node manager is responding (does exist), (ii) `newPort` allocates a new communication port on this node, (iii) `delPort` releases a previous allocated communication port on this node and (iv) `terminate` terminates the node manager.

The node manager is usually invisible for the programmer. The capsules and bindings silently access the node manager to manage their communication ports.

```
" " "
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```
# We need to check the type of some attributes
```

40

```
from types import *
```

41

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```
# For low level communication
```

43

```
from socket import *
```

44

45

```
# Sleep
```

46

```
from time import *
```

47

48

```
# Mainly to grab information about exceptions
```

49

```
import sys
```

50

51

```
# OS related functionality (like fork)
```

52

```
import os
```

53

54

```
# Misc values for the Open-ORB core
```

55

```
from misc import *
```

56

57

```
# Message object for the Open-ORB core
```

58

```
from msg import *
```

59

60

61

```
class NodeMngrException(OpenORBException):
```

62

```
    R " " "Node manager exception
```

63

```
    All exceptions or errors introduced by the nodemngr module is handled by this exception class.
```

```
    """
```

```
    pass
```

69

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71

```
class NodeMngr:
```

72

```

R"""Node manager
80
The node manager manages all the capsules on its node (host). Its only task is to manage communication
ports. The node manager is accessed through a node manager proxy.
"""
81
def __init__(self):
82
R"""Initialize and run the node manager
83
First the node manager initialize itself and then it goes into a loop serving requests from capsules.
Each request is served by calling the method for the given request type (req["op"]).
"""
84
# Initialize data structures
85
debug("New node manager at %s created" % (gethostname(),))
86
self.op = {"ping": self.ping,
87           "newPort": self.newPort, "delPort": self.delPort}
88
self.ports = []
89
# Create and initialize socket
90
self.listen = Msg("", nmPort, 1)
91
# The main (serving) loop
92
while 1:
93
# Recieve a request
94
connection, request = self.listen.recvreq()
95
for req in request:
96
debug("Node manager request: %s" % ('req',))
97
# Terminate?
98
if req["op"] == "terminate":
99
return
100
# Perform the request and send a reply (possible an error)
101
try:
102
if not req.has_key("args"): req["args"] = ()
103
if not req.has_key("kw"): req["kw"] = {}
104
rep = apply(self.op[req["op"]], req["args"], req["kw"])
105
except Exception:
106
(exc, val, tb) = sys.exc_info()
107
str = "Node manager error: %s (%s)" % (req["op"], 'val')
108
debug(str)
109
self.listen.sendrep(connection, ErrorObject(exc, str, tb))
110
else:
111
self.listen.sendrep(connection, rep)
112
def __del__(self):
113
R"""Node manager deleted
114
Clean up before the node manager is deleted.
115
"""
116
debug("New node manager at %s deleted" % (gethostname(),))
117
def ping(self):
118
R"""Ping
119
Used to check if this node manager is alive.
120
"""
121
return "NodeMngr at %s is alive" % (gethostname(),)
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140
def newPort(self, info): 141
    R"""Register new communication port 142

    A new communication port is registered with the information info and a port (and index) number
    is returned.

    """
    index = -1 148
    for i in range(len(self.ports)): 149
        if self.ports[i] == None: 150
            index = i 151
            self.ports[i] = info 152
            break 153
    if index == -1: 154
        index = len(self.ports) 155
        self.ports.append(info) 156
    debug("Node manager new port %s: %d" % ('info', firstPort + index)) 157
    return firstPort + index 158
159

def delPort(self, port): 160
    R"""Delete communication port 161

    Remove a communication port with given port number from the register.

    """
    index = port - firstPort 167
    if (index >= 0) and (index < len(self.ports)): 168
        debug("Port %d (%s) deleted" % (port, 'self.ports[index]')) 169
        self.ports[index] = None 170
        return 0 171
    else: 172
        str = "Node manager: Unknown port: %d" % (port,) 173
        raise IndexError, str 174
175
176
class NodeMngrProxy: 177
    R"""Node manager proxy 178

    A proxy for the node manager. Call the methods of this proxy and they are forwarded to the actual node
    manager and performed there.

    """
    184
    def __init__(self): 185
        R"""Initialize the node manager proxy 186

        Check if the node manager is up and running. If not, start it.

        """
        self.message = Msg("", nmPort) 191
        try: 192
            rep = self.ping() 193
        except error, val: 194
            debug("Node manager not running, try to start it") 195
            try: 196
                pid = os.fork() 197
            except AttributeError, val: 198
                str = "Nodemangr: fork() not available on this platform: %s" \ 199
                    % ('val',) 200
                debug(str) 201
                raise NodeMngrException, str 202
            if pid == 0: 203
                for p in sys.path: 204

```

```

        try:
            path = "%s/nodemngr.py" % (p,)
            file = open(path, 'r')
            file.close()
            break
        except IOError:
            pass
    os.execlp("python", "-d", path)
else:
    sleep(2)
    try:
        rep = self.ping()
    except error, val:
        str = "Node manager not responding: %s" % ('val',)
        debug(str)
        raise NodeMngrException, str
    except Exception, val:
        str = "Node manager unknown error: %s" % ('val',)
        debug(str)
        raise NodeMngrException, str
    if isinstance(rep, ErrorObject):
        debug('ErrorObject.val')
        raise ErrorObject.exc, ErrorObject.val
debug("NodeMngrProxy initialized: %s" % ('rep',))

def ping(self):
    R"""Ping node manager

    Check if the node manager is alive. The node manager returns an alive message (text string).

    """
    return self.message.message({"op": "ping"})

def stopserve(self):
    R"""Terminate node manager

    Send a message to the node manager asking it to terminate itself. We do not check for a result of
    this message.

    """
    self.message.announce({"op": "terminate"})

def newPort(self, info):
    R"""Request new communication port

    A new communication port is requested. The new port number is returned and the port is registered
    under the given information (info).

    """
    return self.message.message({"op": "newPort", "args": (info,)})

def delPort(self, port):
    R"""Delete a communication port

    Delete the communication port with the given port number.

    """
    self.message.message({"op": "delPort", "args": (port,)})

# Make an instance of the node manager or a proxy for the node manager
if __name__ == "__main__":
    nm = NodeMngr()
else:

```

```
nm = NodeMngrProxy() 271
272
273
# LocalWords: Aug Oct UK NORUT aacodefont newPort delPort misc msg nodemngr 274
# LocalWords: NodeMngrException OpenORBException NodeMngr def init req op kw 275
# LocalWords: gethostname nmPort recvreq args exc tb sendrep ErrorObject del 276
# LocalWords: SystemExit str len firstPort IndexError NodeMngrProxy pid py 277
# LocalWords: AttributeError Nodemangr execlp isinstance 278
```