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SCOPE

mod_openopc is a cross platform utility / package / program (whatever you may wish to call it) that has the following goals:

- 1 – function primarily in a Linux kernel 2.6 or greater environment, secondarily function in other environments (including MS Windows [2k kernel or greater, which means Windows 2000 and up]), Macintosh, and any other UNIX or UNIX-Like Operating System (BSD / SunOS [Solaris] / etc...) While it has been shown that performance is poor in MS-Windows (roughly 21 times slower than in Linux based upon non-scientific testing by Sorrento Lactalis US), this is due only to the way Python and MySQL are implemented inside of Windows. Should they be optimized somehow, performance would be more tolerable. Strictly speaking though, mod_openopc is to run on any OS which can support Python and MySQL.
- 2 – serve as a 'front end' for 'Open OPC for Python', thereby turning that library's more complex functions into very simple tasks (add transparency for the end user).
- 3 – serve as a central point of contact for the following discrete items, and integrate them:
 - A OPC Servers running Open OPC Gateway
 - B MySQL Servers and Databases
 - C Web pages issuing write commands to OPC Devices
 - D Any other 3rd party program or device which issues a write command to an OPC Device
- 4 – be self-correcting* with regard to communication between the following:
 - A OPC Server (and Open OPC Gateway) and mod_openopc itself
 - B OPC Device and OPC Server
 - C MySQL and mod_openopc
 - correction takes the form of 'attempting reconnection perpetually until successful', 'breaking connection and reconnecting', or (after attempting the former) faulting out of the routine and generating a fault / error to the system log.
- 5 – function in the form of an 'instance based' application; that is, each 'task' (for lack of a better term) is launched independently, creating multiple threads (one per instance), which allows for excellent scalability

and inherently allows test or problem instances to be killed / terminated independently of the many other running instances.

6 – function as a bridge between two OPC Devices on the same OPC server. For example, an OPC Device on Ethernet may not typically be able to communicate with an OPC Device on Allen Bradley's Data Highway Plus network (without expensive proprietary hardware and program modifications). mod_openopc shall enable fast (relative) read and writes between these devices (messaging).

7 – function as a bridge between two OPC Devices on different OPC servers / networks. For example, an OPC Device on Ethernet, such as a Koyo Direct Logix, cannot typically communicate with an Allen Bradley SLC Series PLC also on Ethernet, or a Modicon on MODBUS. However, provided an OPC Server exists for the devices, then mod_openopc can jump the gap between servers and effectively message between.

8 – run constantly in an industrial environment without the requirement for program maintenance or 'babysitting'. mod_openopc should (once setup properly) recover from communication errors (which are a fact of life on any communication network under any protocol), recover from system restarts due to power outage or similar, and recover from read / write OPC errors. This will not necessarily happen gracefully, but it must happen without human intervention.

SYSTEM REQUIREMENTS – HARDWARE

mod_openopc is intended to be run as a server-side application. This means that a dedicated machine should be setup solely for it. This is not due to compatibility issues or anything of that nature. Rather, it simply will require a lot of “horsepower” to run as intended, when under load and scaled.

Absolute Minimum Hardware

Architecture	i386
Processor	2.0 – 2.2 GHz AMD Athlon Thunderbird / Barton 3.0 GHz Intel Pentium 4 Single Core
Memory	2 GB DDR PC3200 400 MHz
Disk Space	... depends on the size of your database (how much data you wish to store). Plan on no less than 1 GB per machine per year of retention, at an absolute minimum. Your mileage <i>will</i> vary greatly.

Suggested Deployment (500,000 sq. ft. facility):

Architecture	x86_64 (note: this is for the host OS, your OPC Server should reside on a dedicated 32-bit MS-Windows based machine, or in a 32-bit MS-Windows based virtual machine within your host OS. This is for OPC Automation compatibility assurance). ** Virtual guests are ideally single-processor instances ** Minimum Windows version is XP Pro Service Pack 2
Processor	2 each – AMD Opteron 3 rd Generation Barcelona Quad Core @ 2 GHz or better.
Memory	32 GB DDR – 800 Mhz ECC Registered Server Memory

Disk Space ... depends on the size of your database (see above).
Virtual Machine at this time, we are recommending Sun Virtual Box, as VMWare Virtual Server is no longer supported under newer Linux / Unix releases due to new glibc builds and the decision by VMWare to phase out Virtual Server Free Edition. Sun Virtual Box is easier / faster / and ultimately better suited anyway (in our experience)... and it is also freeware / cheap-ware.

Warning:

DO NOT attempt to run mod_openopc itself (any command but 'GATEWAY_DAEMON') in a virtual machine.

Regardless of what your IT department may tell you, the system clock under all versions of Linux that we've tested with a 2.6.18 or better kernel (up to 2.6.23 at least) has failed to stay sync'd properly. Similar issues plague Windows guest operating systems; we've not checked a true UNIX. That said, mod_openopc relies heavily upon the system clock for automated run, and can fault out, causing unpredictable behavior, if the clock 'suddenly stops'. ...and, for the validity of record time stamps, it is suggested 'dalight-savings-time' be disabled, else you'll end up with duplicate records on that one-day-a-year when an hour is repeated on a DST clock.

SYSTEM REQUIREMENTS – SOFTWARE

mod_openopc was developed under Fedora Core 7 [Moonshine], and was intended to be run upon a Linux 2.6 or laterkernel based Operating System. However, it has also been re-developed (version 3 and later) under MS Windows Server 2003 R2, and while performance is degraded (slower) under non Unix/Linux OS's, it functions properly. mod_openopc is compatible with any Operating System that can run Python and MySQL.

*** however we still strongly recommend a UNIX or Linux Operating System, regardless ***

http://www.oracle.com/solaris	SOLARIS
http://www.redhat.com	RHEL Linux
http://www.oracle.com/us/technologies/linux	Unbreakable Linux
http://www.scientificlinux.org	Scientific Linux
http://www.centos.org	CentOS
http://www.freebsd.org	Free BSD

1 – Python Programming Language <http://www.python.org>

- version 2.6 or greater (tested against 2.6 on WIN and UNIX platforms)
- note: this is the first build to deprecate 2.5 and require 2.6, this is due to compile-ability of the win32-libraries for python on what will be your OPC Server virtual guest or dedicated machine. For all commands other than 'GATEWAY_DAEMON', version 2.5 is still good on POSIX hosts.

2 – GNU C Library <http://www.gnu.org/software/libc>

- glibc version 2.6-3 or greater

- 3 – OpenOPC <http://openopc.sourceforge.net>
- version exactly 1.1.6 (this is the latest version)
 - this version is included with your download of mod_openopc, under the folder...
 - mod_openopc_2/opc_server_setup/openopc
 - newer versions of OpenOPC may work (they *should* work – we'll try to adapt until they do) with mod_openopc, however we cannot promise you that they will. As such, each release of mod_openopc will include the latest stable build of OpenOPC that is known to and tested as working. This is how we will remain 'up-to-date'.
- 4 – Oracle/Sun Microsystems MySQL <http://dev.mysql.com>
- version 5.0 or greater (we developed against version 5.1 and 5.0.4)
- 5 – Python Remote Objects “PYRO” <http://pyro.sourceforge.net>
- version 3.7 or greater
- 6 - MySQL-Python <http://mysql-python.sourceforge.net>
- version 1.2 or greater
- 7 – py-setproctitle for Python
- version 1.0 or greater <http://pypi.python.org/pypi/setproctitle/>
- 8 – For your Windows based OPC Server (whether live machine or virtual machine)...
- A OpenOPC, exactly as stated above.
 - B Python for Windows version 2.6 or greater <http://www.python.org>
 - C PyWin32 for Windows version 2.14 or greater <http://pywin32.sourceforge.net>
- 9 – Not Required, but Nice to Have...
- A) Oracle/Sun Virtual Box <http://www.virtualbox.org>
(lets you host your OPC Server as a virtual server inside of your main OS / Server)

BASIC INSTALLATION

After satisfying all of the hardware and software requirements, you can now download and install mod_openopc.

A legitimate and current source shall remain at:

http://download.spinellcreations.com/mod_openopc

*** The following instructions assume a Linux Host OS, however, they are identical (sans file-paths) for other operating systems ***

Decompress the contents of your downloaded file to whichever directory you desire that mod_openopc actually run in. For example, we suggest decompressing the entire structure to *nix filetree...

```
/opt/mod_openopc_2/
```

You should end up with a hierarchy that is...

```
/opt/mod_openopc_2/  
    ./gwcomm  
    ./help  
    ./opc_server_setup  
    ./options  
    ./prog  
    ./server_reset  
    ./temp
```

While this is the age of 'security' and such, mod_openopc has not been tested to be 'permissions friendly'. That is to say, it was developed, and assumes, that all files within itself are RWX available to all users. To ensure this, change permissions for the tree to 0777, such as... (this does not apply in a WIN environment)

```
[root@server] chmod 777 -R /opt/mod_openopc_2
```

Open ./options/options.opt and modify as follows:

*** if you mess up, that's ok... there is a 2nd copy, called default_options.opt which you can simply copy and paste as 'options.opt' and then re-start the editing process ***

```
[global_runtime]  
FLAVOR:UNIX  
    # operating system  
    # -- use UNIX for Linux, Unix, Solaris, BSD, etc, etc...  
    # -- use WIN for Windows  
MINIMALRESPONSE:YES  
    # minimal system echoes back for pulling in data and spitting out  
# data to the opc server.  
    # -- use YES for minimal  
    # -- use NO for verbose  
  
[global_commands]  
PYTHON_EXECUTABLE:/usr/local/bin/python  
# python executable  
# -- usually /usr/local/bin/python on UNIX  
# -- usually C:\Python\python.exe on WIN  
  
[global_throttle]  
THROTTLE:0.5  
    # -- REQUIRES MINIMALRESPONSE = NO
```

```

# throttling value, in seconds.
# we suggest 0.1 (bare minimum if all your ducks are in a row and
# you have good solid network communication on a not-overloaded
# system)to 2 seconds (much slower, but more stable for
# troublesome environments) to allow for sufficient load
# reduction on the opc server (specifically the gateway's
# speaking through to the opc server and allowing device data to
# be gathered) or else you will crash like steve mcqueen. This is
# not the 'fault' of mod_openopc or the OpenOPC Gateway, rather,
# it is just the nature of opc communication. Live with it, or
# you'll end up bottlenecking your system.

[global_network]
MYIP:10.1.12.253
# what is your CU static IP address?
MYDEFAULTGATEWAY:10.1.12.1
# what is your CU default gateway IP address?

[global_openopc]
OPENOPC_TIE_IN:GATEWAY
# define as DIRECT for Windows (experimental)
# define as GATEWAY for Unix / Linux / Other / Windows (stable)

[auto_launch]
AUTO_LAUNCH:READ,mypreset1,30|BRIDGE,mypreset2,60|
# define mod_openopc routines to auto launch
# -- form is ...
# COMMAND,preset-file-name,argument1,argument2,argument3|
# COMMAND,preset-file-name,argument1,argument2,argument3|
# -- MUST INCLUDE TRAILING PIPE!
# -- DO NOT use any spaces.
# -- if a COMMAND does not have any arguments, then it would
# simply be...
# COMMAND,preset-file|COMMAND,preset-file,argument1|
# COMMAND,preset-file,argument1,argument2|
# ... you get the idea.
# ... ultimately everything between 'pipes' is passed as a
# newly spawned process
# where commas are replaced by whitespace. So, the
# example above would be passed as...
# --> mod_openopc.py COMMAND preset-file
# --> mod_openopc.py COMMAND preset-file argument-1
# --> mod_openopc.py COMMAND preset-file argument-1 argument-2

[server_reset]
SERVER_LIST_TO_RESET:thundercracker,30,24
# define mod_openopc servers to auto reset
# -- form is SERVERNAME,DISCONNECT-DELAY,RECYCLE-FREQUENCY-IN-
# HOURS|SERVERNAME2,DISCONNECT-DELAY2,RECYCLE-FREQUENCY-IN-
# HOURS2
# -- DO NOT use any spaces.
# -- DO NOT use a trailing pipe.
# -- for example...
# if you have 2 servers, opc1 and opc2, and you want to reset
# opc1 every 2 days with a delay of 30 seconds to allow
# clients to clean up, and opc2 every 1 day with a 60 second

```

```
#      disconect delay, then you'll use...
#      opc1,30,48|opc2,60,24
```

Setup a MySQL database for your mod_openopc data to be stored in, and be sure to grant privileges to a MySQL user with a password:

```
mysql> CREATE DATABASE mod_openopc;
mysql> GRANT ALL ON mod_openopc.* TO vince@localhost IDENTIFIED BY
      "wesmokekools";
mysql> GRANT ALL ON mod_openopc.* TO vince@* IDENTIFIED BY
      "wesmokekools";
mysql> FLUSH TABLES;
```

Your MySQL server should be setup by a qualified DB administrator, but in addition to the 'usual' configuration steps, the MySQL 'my.ini' (WIN) or 'my.cnf' (UNIX) configuration file MUST include the following flags...

```
old_passwords=1
set-variable = wait_timeout=150000
set-variable = interactive_timeout=150000
```

** THESE FLAGS ARE REQUIRED TO ALLOW mod_openopc TO SELF-POLICE A CONNETION TIMEOUT versus an OPC_TOPIC BEING DOWN.

Setup a new database preset in mod_openopc;

Copy ./options/sql_configs/template.sql to a new database preset name, in case of our example, above, we'll copy to ./options/sql_configs/mod_openopc.sql ... and yes, this is all case sensitive and the preset name must match the sql db name.

```
[sql_server_configs]
MYSQLDB:mod_openopc
# DATABASE NAME
MYSQLIP:localhost
# IPADDRESS, should be "localhost" or actual IP address
# -- MAY HAVE TO USE "QUOTES" FOR IF RUNNING THIS PROGRAM UNDER
#   UNIX
# -- DO NOT USE QUOTES IF RUNNING UNDER WIN
MYSQLFAULT:mod_openopc
# DATABASE THAT HOLDS FAULT TABLE
FAULTTABLENAME:system_faults
# FAULT TABLE NAME
MYSQLUSER:vince
# YOUR MYSQL USERNAME
MYSQLPASS:wesmokekools
# YOUR MYSQL PASSWORD
COMMITTRANSACTIONS:YES
# COMMIT DATABASE TRANSACTIONS AFTER EXECUTION
# -- YES or NO
# -- TRANSACTIONAL DATABASES SUCH AS INNODB REQUIRE
#   THIS FUNCTIONALITY, FUTURE MYISAM WILL ALSO
# -- 'STOCK' MyISAM databases as of January 2010 do not require
#   this.
MYSQLRETENTION:4
```

```

# DB RETENTION TIME FOR RECORDS IN YEARS
FIELDRETENTION:DATESTAMP
# FIELD TO CARRY OUT RETENTION QUERY ON (what we judge age by)
MYSQLMAINTTABLES:TABLENAME1|TABLENAME2|system_faults
# TABLE NAMES (CASE SENSITIVE) TO PERFORM PERIODIC
# MAINTENANCE ON WHEN CALLING 'MAINT_DB' FUNCTION
# -- DO NOT INCLUDE ANY TABLES THAT ARE SUPPOSED
# BE STATIC
# -- DO NOT INCLUDE TRAILING PIPE!
# -- FORM IS TABLE1|TABLE2|TABLE3|system_faults
# -- -- NO QUOTES, NO SPACES (TABLE NAMES MUST BE SINGLE STRING
# WITH NO SPACES)
# -- -- SHOULD ALWAYS INCLUDE system_faults
# UNLESS YOU ARE RUNNING A CUSTOM SCHEME

```

Setup a new server (OPC Server) preset in mod_openopc...

Copy ./options/server_configs/template.opc to a new opc server preset name. Let's continue with our example, and assume that we have a virtual guest OS running Windows with an OPC Server and the Open OPC Gateway on it. And let's say that we're going to call that "opc_server_1". So, copy...

```

./options/server_configs/template.opc
      ← to →
./options/server_configs/opc_server_1.opc

```

```

[opc_server_configs]
SERVER_IP:10.1.12.250
# OPC SERVER IP ADDRESS
SERVER_NAME:RSLinx OPC Server
# OPC SERVER SOFTWARE NAME WHEN QUERIED
SERVER_SERVICE_NAME:RSLinx
# SERVER WIN32 SERVICE NAME FROM ADMINISTRATIVE TOOLS
SERVER_TEST:[TEST]ST9:0
# DESIGNATED TEST PLC AND TAG TO READ
# -- ASSIGN A STRING OR VALUE TO SOME KNOWN PLC OR OPC
# DEVICE SO THAT 'TEST' BATTERY CAN RUN AGAINST IT.
MINIMUM_SCAN_INTERVAL:5
# INTEGER INDICATES SMALLEST AMOUNT
# OF TIME BETWEEN READ ROUTINES THAT
# ARE ON A SCHEDULE SO WE DON'T
# POUND A SERVER UNDER HEAVY LOAD
OPC_DEVICENAME_START_TRIM:1
OPC_DEVICENAME_END_TRIM:1
# NUMBER OF CHARACTERS TO TRIM FROM THE
# START AND END OF AN OPC DEVICE NAME
# FOR EXAMPLE...
# - (RSLinx)
# [MYPLC1]N7:10
# - DEVICE NAME IS ACTUALLY "MYPLC1"
# NOT [MYPLC1], SO WE SET VALUE OF "1"
# FOR START_TRIM and VALUE OF "1" FOR
# END_TRIM.
# - (Kepware)

```

```

#          CH1.MYPLC1.N7:10
#          - DEVICE NAME IS ACTUALLY "MYPLC1"
#          NOT "CH1.MYPLC1.", SO WE SET VALUE
#          OF "4" FOR START_TRIM AND VALUE OF
#          "1" FOR END_TRIM.

```

Setup a fault container:

*** If you are using the S.E.E.R. II front-end, then DO NOT PERFORM THIS STEP. Instead, proceed to S.E.E.R. Install and configuration, at which point you can create the fault container automatically when creating the 'mod_openopc Database' from the Settings Tab. ***

mod_openopc needs a table created within itself called 'system_faults' . This is where any problems encountered (typically communication faults) are logged when any instance of mod_openopc is working with an opc server that is having data logged. So, continuing with our example...

```

mysql> USE mod_openopc;
mysql> CREATE TABLE system_faults(
    DATESTAMP VARCHAR(20),
    INDEX(DATESTAMP),
    TYPE VARCHAR(15), INDEX(TYPE),
    ROUTINE VARCHAR(55), INDEX(ROUTINE),
    PARTNER VARCHAR(20), INDEX(PARTNER),
    ACKNOWLEDGED VARCHAR(30), INDEX(ACKNOWLEDGED)
);

```

If you choose to use the InnoDB database engine (allows hot backups – consult your database admin first – but yes, we DO RECOMMEND IT!)...

```

mysql> ALTER TABLE system_faults CHANGE ENGINE=InnoDB;

```

Open up ./options/presets/system_faults.pre and edit as follows:

```

[your_server]
YOUROPCSERVER:none
    # required placeholder
YOURSQLSERVER:mod_openopc
    # preset sql server name
YOURSQLTABLE:system_faults
    # preset sql table
COMMENTENABLE:no
    # required placeholder
YOURSQLCOMMENTTABLE:none
    # required placeholder
YOURSQLFILLERCOUNT:0
    # required placeholder
YOURSQLCOLUMNCOUNT:0
    # required placeholder

[your_read]
YOURLEAFERS:none
    # required placeholder

```

SETUP YOUR OPC SERVERS AND THE GATEWAY

Before we can go any further, we must setup an OPC Server and Open OPC Gateway on our guest (or other machine) Windows based OS. Assuming you have already setup a WinXP or Server'03 guest OS (32 bit is advised for OPC Server support – at least until the industry catches up with modern computers. *mod_openopc* and *OpenOPC* are fine regardless of architecture.) you can proceed as follows...

*** Be aware, this section is where we get the information to enter into the previous section, where we talk about "Setup a New OPC Server Preset in mod_openopc"... ***

Install your OPC Server software (RSLink, Kepware, Matrikon, etc...)

MAKE SURE YOUR OPC SERVER SOFTWARE IS SETUP AS A WINDOWS SERVICE!

Give your guest OS (or physical machine) a unique IP address. Following our example, let's use 10.1.12.250.

In your OPC Server Setup, create a new TOPIC called "opc_server_1_test".

For further examples and to allow us to show you other functions later, let us also create a second TOPIC called "plc_hydraulic_system", and map that to a PLC at some address, let's say 10.1.12.60 (obviously, use a real address of one of your real PLC's).

Copy the entire *mod_openopc* distribution over to your OPC Server as...
C:\mod_openopc_2

Install the Open OPC Gateway Service:

Open a command prompt (DOS Shell → Start / Run / cmd)...

```
C:\> cd C:\mod_openopc_2\opc_server_setup\openopc
C:\> cd bin
C:\> OpenOPCService.exe -install
```

```
Installing service OpenOpcService
Service Installed
```

Go to Start → Control Panel → Administrative Tools → Services ...

Scroll down the list until you find "OpenOpcService"...

Click on it, and edit properties as follows:

```
- startup type =           MANUAL
- enable / disable =      ENABLED
- 1st failure =            RESTART SERVICE
- 2nd failure =           RESTART SERVICE
- Subsequent failure =    RESTART SERVICE
```

Click "OK" to save your changes.

While still in the Services tab, find the service for your OPC Server Software (RSLinx, Kepware, etc...) and edit properties as follows:

- startup type = AUTOMATIC
- enable / disable = ENABLED
- 1st failure = RESTART SERVICE
- 2nd failure = RESTART SERVICE
- Subsequent failure = RESTART SERVICE

Click "OK" to save your changes.

Now, write down the NAME of the OPC Server Software itself, this is inside the PROPERTIES tab. We need this name in a moment...

*** Assuming you've installed Python and the PyWin32 utilities / libraries, then you may proceed...*

Create a shortcut to the following, and place it in your Windows START folder so that it may be launched when your OPC Server Operating System starts up...

```
C:\[python]\python.exe C:\mod_openopc_2\prog\mod_openopc.py GATEWAY_DAEMON
```

This will monitor via network port 7767, on all interfaces, for valid mod_openopc requests for reset by the SERVER_RESET subroutine running on your primary (in this example, Linux) machine.

*** Note, it is highly suggested that you set the OPC Server guest WIN OS to auto-login on boot. Refer to your Windows documentation on how to do this... ***

Edit your Windows Workgroup...

Go to START → CONTROL PANEL → SYSTEM

Change the Workgroup to = "modopenopc"

Create a USERNAME / PASSWORD for auto-login under Windows...

Go to START → CONTROL PANEL → USERS.

- Create User = modopenopc
- w/password = communicate
- w/level = Administrator

You should now reboot your WIN guest OS or machine. When it boots up, you will see the OPC Server automatically start up, and you will also see the mod_openopc GATEWAY_DAEMON... It will launch the Gateway Service about 30 seconds after it loads itself. The windows will not close, and you should NOT close it. It needs to run constantly. If you're firewalled, make sure port #7767 is open for both TCP/UDP and RAW connections, as we've yet to decide on a formal protocol, so if you jump versions, the comm type might change.

USING PRESETS

The best way to use mod_openopc is with preset files.

Preset / Command BRIDGE →

Allow you to READ a value from one opc device and write that value back to another opc device on the same opc server. This takes the place of (for example) PLC Messaging, and allows you to bridge networks that otherwise couldn't 'talk' to each other, such as Allen Bradley Data Sidewalk and Allen Bradley Ethernet/IP.

In ./options/presets, copy ./template/template.brg to...

```
./options/presets/my_first_bridge.brg
```

Edit my_first_bridge.brg as follows...

```
[your_server]
YOUROPCSERVER:grimlock
DATA_SOURCE:cache
# CHOICES ARE 'cache' or 'hybrid' (CASE SENSITIVE)
# -- hybrid USES DIRECT DEVICE READS (HIGH CPU USAGE)
# -- cache USES OPC SERVER OPTIMIZED CACHE READS (BEST
#     PERFORMANCE)
YOURLSERVER:modopenopc
# SQL SERVER JUST FOR LOGGING FAULTS

[your_bridge]
YOURLEAFERS:XXX[MY_PLC_1]YYYYF11:11&XXX[MY_PLC_1]YYYYF11:41&|
YOURLEAFERS2:XXX[MY_PLC_2]YYYYF11:48&XXX[MY_PLC_2]YYYYF11:49&|
YOURBRIDGELENGTH:2
# YOURLEAFERS - the SOURCE data points or registers
# YOURLEAFERS2 - the TARGET data points or registers
#
# preset leaves to bridge, follow form ...
# "LEAFIDENTIFICATION&|
# where & delineates columns in the table and |
# delineates rows
# TYPICALLY, LEAFS ARE IN THE FORM OF ...
#     XXX[TARGETNAME]YYYYTAG
# SUCH AS...
#     XXX[MY_PLC]YYYN7:42
#
# BE ADVISED... YOU MUST ENSURE REGISTER (TAG)
# COMPATABILITY BEFORE YOU BRIDGE. mod_Open_Opc
# will not check!
# For Example...
#     x - Integers can copy to Floats
#     x - Floats can't copy to Integers
#         (they should round though)
#     x - DINT's can copy to INT's
#     x - INT's can't copy to DINT's
#     x - STRING can copy to STRING
#     x - STRING can't copy to anything else
#         you get the idea...
#     x - BIT is cleanest at word level but
```

```

#           can be discrete
#           x - INT and DINT should copy at word
#             level but you can
#             perform discrete copies as well.
#           x - ELEMENTS (such as T4:10.PRE) can
#             copy directly, you don't have to
#             bridge the entire Timer.
#
# BRIDGE LENGTH ... the number of leaves in a bridge
# set. All sets must be of the same length, or else
# you will have to not 'use' sets, and, rather
# just have one very big set. Using sets gives
# you fault detection and the ability to jump
# over leaves attached to equipment that may be
# powered down or not working.
# A set is the full string of leaves up until
# the '&|' separator. Counting starts
# at 1, not zero, so if you have 9 items, then
# list it as "9", not "8".

```

Save the file, and you can now launch it with...

```

[root@server] ./prog/mod_openopc.py BRIDGE [preset file basename] \
[root@server] [scan_interval] [OVERRIDE | --blank-- ]

```

Where...

```

preset file basename = my_first_bridge
scan interval =       seconds (suggest 2 to 10) to wait between each
                       bridge execution
override =           OVERRIDE (or blank), this allows us to override
                       the minimum scan interval variable from the
                       mod_openopc options.opt file. If you choose a
                       scan time of less than the minimum scan
                       interval, but do not specify OVERRIDE, then the
                       minimum scan interval will remain in effect.

```

Example real world call...

```

[root@server] ./prog/mod_openopc.py BRIDGE my_first_bridge 2  OVERRIDE

```

Preset / Command SPACE_BRIDGE →

Allow you to READ a value from one opc device and write that value back to another opc device on A DIFFERENT opc server. This takes the place of (for example) PLC Messaging across expensive 3rd party Gateway Devices, or simply enables messaging where it was otherwise impossible. Networks that otherwise couldn't 'talk' to each other, such as Allen Bradley Ethernet/IP and Modicon MODBUS.

In ./options/presets, copy ./template/template.sbrg to...

```
./options/presets/my_first_spacebridge.sbrg
```

Edit my_first_spacebridge.sbrg as follows...

```

[your_server]
YOUROPCSERVER:grimlock
DATA_SOURCE:cache
    # CHOICES ARE 'cache' or 'hybrid' (CASE SENSITIVE)
    # -- hybrid USES DIRECT DEVICE READS (HIGH CPU USAGE)
    # -- cache USES OPC SERVER OPTIMIZED CACHE READS (BEST
    #     PERFORMANCE)
YOURSQLSERVER:modopenopc
    # SQL SERVER JUST FOR LOGGING FAULTS
YOURSPACEBRIDGE:grimlock_hmi
    # mod_openopc WRITE_DAEMON instance where the
    #     gathered data shall be exported to.

[your_bridge]
YOURLEAFERS:XXX[MY_PLC_1]YYYYF11:11&XXX[MY_PLC_1]YYYYF11:41&|
YOURLEAFERS2:XXX[MY_PLC_2]YYYYF11:48&XXX[MY_PLC_2]YYYYF11:49&|
YOURBRIDGELENGTH:2
    #     YOURLEAFERS - the SOURCE data points or registers
    #     YOURLEAFERS2 - the TARGET data points or registers
    #
    #     preset leaves to bridge, follow form ...
    #     "LEAFIDENTIFICATION&|
    #     where & delineates columns in the table and |
    #     delineates rows
    #     TYPICALLY, LEAFS ARE IN THE FORM OF ...
    #     XXX[TARGETNAME]YYTAYG
    #     SUCH AS...
    #     XXX[MY_PLC]YYYN7:42
    #
    #     BE ADVISED... YOU MUST ENSURE REGISTER (TAG)
    #     COMPATABILITY BEFORE YOU BRIDGE.  mod_Open_Opc
    #     will not check!
    #     For Example...
    #         x - Integers can copy to Floats
    #         x - Floats can't copy to Integers
    #             (they should round though)
    #         x - DINT's can copy to INT's
    #         x - INT's can't copy to DINT's
    #         x - STRING can copy to STRING
    #         x - STRING can't copy to anything else
    #             you get the idea...
    #         x - BIT is cleanest at word level but
    #             can be discrete
    #         x - INT and DINT should copy at word
    #             level but you can
    #             perform discrete copies as well.
    #         x - ELEMENTS (such as T4:10.PRE) can
    #             copy directly, you don't have to
    #             bridge the entire Timer.
    #
    #     BRIDGE LENGTH ... the number of leaves in a bridge
    #     set.  All sets must be of the same length, or else
    #     you will have to not 'use' sets, and, rather
    #     just have one very big set.  Using sets gives
    #     you fault detection and the ability to jump
    #     over leaves attached to equipment that may be
    #     powered down or not working.
    #     A set is the full string of leaves up until
    #     the '&|' separator.  Counting starts
    #     at 1, not zero, so if you have 9 items, then
    #     list it as "9", not "8".

```

Save the file, and you can now launch it with...

```
[root@server] ./prog/mod_openopc.py SPACE_BRIDGE \  
[root@server] [preset file basename] [scan_interval] \  
[root@server] [OVERRIDE | --blank-- ]
```

Where...

```
preset file basename = my_first_spacebridge  
scan interval =       seconds (suggest 2 to 10) to wait  
                      between each bride execution  
override =           OVERRIDE (or blank), this allows us  
                      to override the minimum scan interval  
                      variable from the mod_openopc  
                      options.opt file. If you choose a scan  
                      time of less than the minimum scan  
                      interval, but do not specify OVERRIDE,  
                      then the minimum scan interval will remain  
                      in effect.
```

Example real world call...

```
[root@server] ./prog/mod_openopc.py SPACE_BRIDGE my_first_bridge 2 OVERRIDE
```

Preset / Command WRITE →

Allow you to WRITE a value from a preset file to an OPC Device. This is excellent for loading recipes, which can take doing a machine product changeover from editing 20 different settings to simply allowing an operator to press one button and let mod_openopc do the rest.

In ./options/presets, copy ./template/template.wrt to...

```
./options/presets/my_first_write.wrt
```

Edit my_first_write.wrt as follows...

```
[your_server]  
YOUROPCSERVER:opcname  
    # preset opc server name  
YOURSQLSERVER:sqlname  
    # preset sql server name  
    # strictly for reporting faults  
  
[your_write]  
YOURLEAFERS:LEAFIDENTIFICATION&VALUETOWRITE&|  
            2NDLEAF&VALUETOWRITETO2NDLEAF&|  
    # preset leaves to bridge, follow form  
    # "LEAFIDENTIFICATION&|  
    # where & delineates columns in the table and |  
    # delineates rows  
    #  
    # TYPICALLY, LEAFS ARE IN THE FORM OF ...  
    # XXX[TARGETNAME]YYTAG
```

```

#     SUCH AS...
#         XXX[MY_PLC]YYYN7:42
#     SO...
#         XXX[MY_PLC]YYYN7:42&2.5&|    ... would
#         write value 2.5 to leaf N7:42 of MY_PLC
#

```

Save the file, and you can now launch it with...

```
[root@server] ./prog/mod_openopc.py WRITE [preset file basename] [scan_interval]
```

Where...

```

preset file basename = my_first_write
scan interval =      time, in seconds for a timeout
                    reference, this may eventually be
                    eliminated, as it serves very little
                    purpose. Typically, set to 30 seconds...
                    if it takes more than 30 seconds for a
                    WRITE, then something is severely wrong
                    with your setup or network.

```

Example real world call...

```
[root@server] ./prog/mod_openopc.py WRITE my_first_write 30
```

Preset / Command
READ →

Allow you to READ, repeatedly, from an OPC Device, and log that data to a MySQL database table.

In ./options/presets, copy ./template/template.pre to...

```
./options/presets/my_first_read.pre
```

Edit my_first_read.pre as follows...

```

[your_server]
YOUROPCSERVER:opcname
    # preset opc server name
DATA_SOURCE:cache
    # CHOICES ARE 'cache' or 'hybrid' (CASE SENSITIVE)
    # -- hybrid USES DIRECT DEVICE READS (HIGH CPU USAGE)
    # -- cache USES OPC SERVER OPTIMIZED CACHE READS (BEST
    #     PERFORMANCE)
YOURSQLSERVER:sqlname
    # preset sql server name
YOURSQLTABLE:sqltable
    # preset sql table
COMMENTENABLE:no
    # 'yes' or 'no', if yes, then set
    # below to presetname_comment, or name
    # of table holding the comments.
    # if no, set below to 'none'
YOURSQLCOMMENTTABLE:none
    # preset sql table

```

```

# correspondes to comments for this preset.
# comment column counts as a filler column,
# so do NOT include a comment column as
# part of the sqlcolumncount, rather, count
# it as part of the fillercount.
YOURSQLFILLERCOUNT:0
# integer number, corresponding to the
# number of empty cells of columns left
# at the right hand side of your table.
# this is useful for inserting partial
# records. set to 0 if you're not
# using it, or if your leafers will
# fill up entire row in table.
YOURSQLCOLUMNCOUNT:0
# integer number, corresponding to the
# number of columns per row of your sql
# table... note that this requires all
# rows to fill with the same number of
# columns. DO NOT INCLUDE FILLER COLUMNS!

[your_read]
YOURLEAFERS:LEAFIDENTIFICATION&ANOTHERLEAF&|
                2NDROWLEAF1&2NDROWLEAF2&|
# preset leaves to read, follow form
# LEAFIDENTIFICATION&|
# where & delineates columns in the table and |
# delineates rows.

# TYPICALLY, LEAFS ARE IN THE FORM OF ...
# XXX[TARGETNAME]YYTAG
# SUCH AS...
# MY_FAVORITE_PLC, TAG N7:42 would be
# listed as
# XXX[MY_FAVORITE_PLC]YYN7:42
# FOR EXAMPLE...
# YOURLEAFERS:XXX[MY_PLC_1]YYN7:20&
# XXX[MY_PLC_1]YYN7:21&|

```

Save the file, and you can now launch it with...

```
root@server] ./prog/mod_openopc.py READ [preset file basename] [scan_interval]
```

Where...

```

preset file basename = my_first_read
scan interval =       time interval of scans (every X
                      seconds)

```

Example real world call...

```
[root@server] ./prog/mod_openopc.py READ my_first_read 30
```

Preset / Command
READ_ONE_SHOT →

Exactly the same as READ, except it is only performed *once*.

Make and edit a presetfile the same as for a READ...

Save the file, and you can now launch it with...

```
[root@server] ./prog/mod_openopc.py READ_ONE_SHOT [preset file basename] \  
[root@server] [scan_interval]
```

Where...

```
preset file basename = my_first_read_one_shot  
scan interval = time, in seconds for a timeout  
reference, this may eventually be  
eliminated, as it serves very little  
purpose. Typically, set to 30 seconds...  
if it takes more than 30 seconds for a  
READ, then something is severely wrong  
with your setup or network.
```

Example real world call...

```
[root@server] ./prog/mod_openopc.py READ_ONE_SHOT my_first_read_one_shot 30
```

Preset / Command
READ_DAEMON →

Once launched, this daemon scans a folder for file system events. When one occurs, the new file is parsed for information, and then a READ_ONE_SHOT is performed using a regular READ preset, which has been defined by the file system event.

Let's say we want to create a READ_DAEMON for the opc server that we call "opc_server_1".... For this, we will choose to accept flat files in `/[path]/mod_openopc_2/gwcomm/opc_server_1_read`

*** NOTE – you have the option of creating the folder (in our example "opc_server_1_read" under the `/[path]/mod_openopc_2/gwcomm/` directory yourself, and giving it permissions of `0777`; or `mod_openopc` will create it for you the first time you run this command with your new 'my_first_read_daemon' preset. `mod_openopc` will continually check for and create if necessary this folder ***

In `./options/presets`, copy `./template/template.rdm` to...

```
./options/presets/my_first_read_daemon.rdm
```

Edit `my_first_read_daemon.rdm` as follows...

```
[your_server]  
YOUROPCSERVER:name_of_opc_server  
# preset opc server name  
YOURLSQLSERVER:name_of_sql_server  
# preset sql server name  
# strictly for reporting faults
```

```
[your_daemon]
YOURDAEMON:subdirectory_in_GWCOMM_directory
# where flatfiles will be exported to by
# other programs, in order to call for a read.
```

Save the file, and you can now launch it with...

```
[root@server] ./prog/mod_openopc.py READ_DAEMON [preset file basename]
```

Where...

```
preset file basename = my_first_read_daemon
```

Example real world call...

```
[root@server] ./prog/mod_openopc.py READ_DAEMON my_first_read_daemon
```

FLATFILE form for event files is...

```
# START READ_DAEMON EVENT FILE
[your_read]
YOURREAD:any_read_preset_basename
#-- READ PRESET FROM FILE
# END OF FILE
```

Where all end-of-lines are assumed to be UNIX friendly
“\n”.

Preset / Command
WRITE_DAEMON →

Once launched, this daemon scans a folder for file system events. When one occurs, the new file is parsed for information, and then a WRITE is performed using EITHER OF a regular WRITE preset, which has been defined by the file system event, or DYNAMIC values, declared by the file system event.

Let's say we want to create a WRITE_DAEMON for the opc server that we call “opc_server_1”.... For this, we will choose to accept flat files in /[path]/mod_openopc_2/gwcomm/opc_server_1_write

*** NOTE – you have the option of creating the folder (in our example “opc_server_1_write” under the /[path]/mod_openopc_2/gwcomm/ directory yourself, and giving it permissions of 0777; or mod_openopc will create it for you the first time you run this command with your new 'my_first_read_daemon' preset. mod_openopc will continually check for and create if necessary this folder ***

In ./options/presets, copy ./template/template.wdm to...

```
./options/presets/my_first_write_daemon.wdm
```

Edit my_first_read_daemon.rdm as follows...

```
[your_server]
YOUROPCSERVER:name_of_opc_server
```

```
# preset opc server name
YOURSQLSERVER:name_of_sql_server
# preset sql server name
# strictly for reporting faults
```

```
[your_daemon]
YOURDAEMON:subdirectory_in_GWCOMM_directory
# where flatfiles will be exported to by
# other programs, in order to call for a WRITE.
```

Save the file, and you can now launch it with...

```
[root@server] ./prog/mod_openopc.py WRITE_DAEMON [preset file basename]
```

Where...

```
    preset file basename = my_first_write_daemon
```

Example real world call...

```
[root@server] ./prog/mod_openopc.py WRITE_DAEMON my_first_write_daemon
```

FLATFILE form for event files is... { DECLARED VALUES }

```
# START WRITE_DAEMON EVENT FILE
[your_write_type]
YOURWRITETYPE:DECLARED
# -- WRITE DECLARED VALUES TO OPC TARGET
[your_leafers]
YOURLEAFERS:LEAFIDENTIFICATION&VALUETOWRITE&|
                2NDLEAF&VALUETOWRITETO2NDLEAF&|
YOURWRITEPRESET:NONE
# -- NAME OF PRESET FILE TO WRITE
# END OF FILE
```

Where all end-of-lines are assumed to be UNIX friendly
“\n”.

FLATFILE form for event files is... { PRESET VALUES }

```
# START WRITE_DAEMON EVENT FILE
[your_write_type]
YOURWRITETYPE:PRESET
# -- WRITE DECLARED VALUES TO OPC TARGET
[your_leafers]
YOURLEAFERS:NONE
YOURWRITEPRESET:any-existing-mod_openopc-WRITE-preset-basename
# -- NAME OF PRESET FILE TO WRITE
# END OF FILE
```

Where all end-of-lines are assumed to be UNIX friendly
“\n”.

Preset / Command MAINT_DB →

Performs daily maintenance on your MySQL database tables.
Deletion and cleanup of NULL records and deletion of records that
are older than the “RETENTION TIME” declared in your SQL

configuration file. In the least, perform once weekly....
schedule it with WIN task scheduler or CRON in UNIX.

Tables to be cleaned up are pulled from the global options file (options.opt), as whatever you've declared them to be.

```
[root@server] ./prog/mod_openopc.py MAINT_DB [sql_preset_name] \  
[root@server] [OPTIMIZE |-blank- ]
```

Where...

OPTIMIZE executes a full re-index / re-order optimization on a table, which takes a LOT of horsepower, a lot of time, and is mostly unnecessary.

Example real world call...

```
[root@server] ./prog/mod_openopc.py MAINT_DB mod_openopc
```

Preset / Command
AUTO_LAUNCH →

Launches all of your mod_openopc presets, and server daemons for all of your opc servers (you decalred which ones you wanted auto launched in the global options [options.opt] file – see section at the bottom 'Auto Launch').

This works wonderfully for system startup, as you can add it to your 'rc.local' start file or your START folder.

***On Linux / Unix flavors, it should be called with...*

```
[path-to]nohup [path-to]python [path-to]mod_openopc.py AUTO_LAUNCH CONFIRM 2>/dev/null 1>/dev/null &  
... this will properly fork the entire process and all subthreads to the  
background, and out of your console window (or the startup TTY).**
```

```
[root@server] ./prog/mod_openopc.py AUTO_LAUNCH [CONFIRM | -blank- ]
```

Where...

CONFIRM actually executes the auto start function... anything else, or blank, will result in simply displaying what WOULD HAVE BEEN DONE; which is nice if you're looking to make sure your updates to a running system have gone through as your intended.

Example real world call (such as that which would be added to a startup file)...

```
[root@server] /usr/bin/nohup /usr/local/bin/python \  
[root@server] /opt/mod_openopc_2/prog/mod_openopc.py \  
[root@server] AUTO_LAUNCH CONFIRM 2>/dev/null 1>/dev/null &
```

Preset / Command
SERVER RESET →

Peforms a systemwide, controlled, reset of the Open OPC Gateway Service and the OPC Server which both run on the guest (or other physical system) OS. This is used as a preventative measure to deal with the OPC Automation DLL memory leak under Windows.

It is a workaround, not a fix. The responsibility for the fix lay with the OPC Foundation and/or the Automation DLL vendors (this is our OPINION / BELIEF, and is not being put forth as if to claim absolute 'fact' in any way), not the mod_openopc or Open OPC projects. However, if you balance the load between your opc servers properly, and you build enough 'beef' into your opc servers, you can get away with a once weekly reset. However, just as a precaution, we recommend resetting once PER DAY. This does not restart any computer OS. It simply drops the Gateway Service and OPC Server Services. All client threads (instances) of mod_openopc are put into a hold state, where they disconnect from their respective Gateways, wait for the cycle, and then come back up. The whole process takes anywhere from 30 seconds to a minute or so, depending on what you set your "delay" variable to.

Be advised, the "delay" variable should be set to no less than 15 seconds, and mod_openopc enforces this! - set it to "2" and mod_openopc will auto-bump it up to 15.

*** Calling the SERVER_RESET function can be done manually, however the SERVER_DAEMON will do this for you, auto-magically at your desired interval if you've set up your options.opt file correctly! ***

Structure...

```
[root@server] ./prog/mod_openopc.py SERVER_RESET [opc_servername] [delay]
```

Example real world call...

```
[root@server] ./prog/mod_openopc.py SERVER_RESET opc_server_1 25
```

Preset / Command SERVER_DAEMON →

Auto-magically calls SERVER_RESET subroutine on the specified OPC Server at the specified interval, so that you don't have to schedule it as a job.

This subroutine is invoked by AUTO_LAUNCH on all of the OPC Servers you declared in the global_options (options.opt) file. You can, however, invoke it manually. Be advised, though, that you should NEVER have two instances of this daemon running for the same OPC Server!

Structure...

```
[root@server] ./prog/mod_openopc.py SERVER_DAEMON \  
[root@server] [opc_server] [delay] [recycle time]
```

Where...

opc_server = OPC Server to reset (must match config file name... [whatever].opc)
delay = delay time to allow running subroutines to disconnect from the OPC Server before resetting it (in seconds)
 * must be >= 15
recycle_time = hours between resets... so for a daily reset, this would be "24", or for a weekly reset this would be "168" (in hours)

Example real world call...

```
[root@server] ./prog/mod_openopc.py SERVER_DAEMON \  
[root@server] thundercracker 25 48
```

Preset / Command
GATEWAY_DAEMON →

Runs ONLY on the OPC Server virtual guest OS (or dedicated machine), and listens for network communication from SERVER_RESET subroutines.

Resets OpenOPC Gateway Service and the OPC Server Service.

*** You do NOT need a completed global options (options.opt) file in order to run this subroutine. It will function "all on its own". The comm part is hardcoded as 7767 (OpenOPC Gateway uses 7766).*

*** Make sure ports 7766 and 7767 are OPEN for all protocols between your OPC Server virtual guest (or dedicated machine) and the Primary Machine running mod_openopc.*

*** If you -REALLY-- want to change these ports, you can do so in the first few lines of the source, and must be done on both OS instances. This is NOT recommended!*

Structure / Call...

```
[root@server] ./prog/mod_openopc.py GATEWAY_DAEMON
```

Preset / Command
HELP →

Displays the help file with all available commands, switches, and their structure. Similar to this section, but less fleshed out. It's your basic help command.

Structure / Call...

```
[root@server] ./prog/mod_openopc.py HELP
```

Preset / Command
SETTINGS →

Displays all settings within your global options (options.opt) file, as you have entered them, for your reference or for debugging of your preset files.

Structure / Call...

```
[root@server] ./prog/mod_openopc.py SETTINGS
```

Preset / Command
TEST_FOR_ECHO →

Performs a health assessment on your installation, this is an invaluable troubleshooting tool!

Structure...

```
[root@server] ./prog/mod_openopc.py TEST_FOR_ECHO [opc_servername]
```

Example real world call...

```
[root@server] ./prog/mod_openopc.py TEST_FOR_ECHO opc_server_1
```

*** Below is a sample output when running under Windows Server 2003 R2 32 bit ***

```
mod_openopc Copyright (C) 2008-2009
U. Spinelli for Sorrento Lactalis American Group
This program comes with ABSOLUTELY NO WARRANTY;
As this program is based on [and has dependancies]
the content of GPL and LGPL works, GPL is preserved.
This is open software, released under GNU GPL v3,
and you are welcome to redistribute it, with this
tag in tact.
... http://www.sorrentolactalis.com/
... http://www.spinellcreations.com/
A copy of the GPL should be included with this work.
If you did not receive a copy, see...
http://www.gnu.org/licenses/gpl-3.0.txt

-- The only people who have anything to fear from
-- free software are those whose products are worth
-- even less. - David Emery

NOTICE! -- YOUR RUNTIME PARAMETERS ARE DEFINED
IN THE GLOBAL OPTIONS FILE AS FOLLOWS...
-- FLAVOR= WIN
-- PROCNAME IS NOT AVAILABLE ON WIN FLAVOR
-- DISABLING UERBOSE OPERATION
-- MINIMALRESPONSE= NO

NOTICE! -- YOUR PATHS ARE DEFINED IN THE GLOBAL
OPTIONS FILE AS FOLLOWS...
-- PROGPATH= C:\mod_openopc_2
-- PROGPATH_OPTIONS= C:\mod_openopc_2\options
-- PROGPATH_OPC= C:\mod_openopc_2\options\server_configs
-- PROGPATH_SQL= C:\mod_openopc_2\options\sql_configs
-- PROGPATH_PRE= C:\mod_openopc_2\options\presets
-- PROGPATH_PROG= C:\mod_openopc_2\prog
-- PROGPATH_RESET= C:\mod_openopc_2\server_reset
-- PROGPATH_GWCOMM= C:\mod_openopc_2\gwcomm
-- TEMPDIR= C:\mod_openopc_2\temp

NOTICE! -- YOUR SYSTEM COMMANDS ARE DEFINED IN
THE GLOBAL OPTIONS FILE AS FOLLOWS...
-- YOUR CMD TO SLEEP IS...
C:\mod_openopc_2\opc_server_setup\openopc\gw_start\sleep.exe
-- YOUR CMD TO CAT IS...
NONE
-- YOUR CMD TO RM IS...
del
-- YOUR CMD TO CHMOD IS...
cacls
```

```
STARTING ROUTINE - TEST_FOR_ECHO
-- SKIPPING THREAD RENAME via PROCNAME
-- -- YOU ARE RUNNING ON WIN FLAVOR

NOTICE! -- USING CLI ARGUMENT OVERRIDES...
-- YOUR TESTED OPC SERVER IS...

NOTICE! -- YOUR OPC_PRESETFILE IS...
C:\mod_openopc_2\options\server_configs\grimlock.opc
-- opened.
-- -- added section 'opc_server_configs'.
-- reading.
-- -- read section 'opc_server_configs'.
-- -- manipulated vars as needed.

NOTICE! -- GATEWAY IS UP AT ADDRESS...
10.1.12.253
YOUR OPC SERVER IS...
RSLinx OPC Server

NOTICE! -- OPC SERVER IS UP WITH NAME...
RSLinx OPC Server

TEST FOR ECHO -- POLLING the DESIGNATED TEST PLC
RESPONSE IS...
None

OPC CONNECTION CLOSED, ALL DONE

NOTICE -- THIS WINDOW WILL STAY VISIBLE FOR 90 SECONDS
OR UNTIL YOU CLOSE IT.
```

ADDITIONAL HELP

- For additional help with this package, setting it up, or just general “what is ... xyz?”, contact the author at...

Vince@SpinelliCreations.com

- For the latest downloads / patches / etc. publicly released, visit...

http://download.spinellcreations.com/mod_openopc

- For the latest news on this project, go to...

http://spinellcreations.com/spark/project_mod_openopc.php

DOCUMENT REVISION HISTORY (THIS DOC)

VERSION	DATE	BASED on BUILD	NOTES
1	2009-04-05	# 23	- first draft
2	2010-01-11	# 35	- massive rework of program and this document.
3	2010-05-04	# 40	- minor rework of document, based upon new method of file- system path import.
4	2010-11-13	# 49	- large rework of program to eliminate need for server reset delay to be based upon the scan interval of other subroutines, all helper scripts eliminated (integrated into main body of program), and the Gateway Monitor has become the GATEWAY_DAEMON subroutine.
5	2011-04-12	#51	- small rework / enhancement of program with drastic effects; you should review the revision history at this point for more details. However the documentation has been updated accordingly.
6	2011-05-03	#52	- MAINT_DB subroutine call structure corrected.