Project: mod_openopc_2

Codename: Bad Medicine

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FORKED PROEJCTS

Project Name	*http://*	*Contact*	*License*
OpenOPC for Python	openopc.sourceforge.net	Barry Barnreiter	GNU GPL (Perpetual)

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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...)

2 – adapt the complex functions of 'Open OPC for Python' into a transparent implementation.

3 – serve as a central point of contact for the following discrete items, and integrate them:

A OPC Servers
B MySQL Servers and Databases
C Web pages issuing read/write commands to OPC Devices
D Any other 3rd party program or device which issues read/write command to an OPC Device

4 – be self-correcting* with regard to communication between the following:

A OPC Server (and 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 a serial 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 ***will*** 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 MS-Windows based machine, or in a MS-Windows based virtual machine within your host OS. This is for OPC Automation compatibility assurance). ** Minimum Windows version is XP Pro Service Pack 2
Processor	2 each – AMD Opteron 3rd 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 subjective opinion)... and it is also freeware / cheap-ware.

Warning:

We do NOT advise runing mod_openopc itself (any command but 'GATEWAY_DAEMON') in a virtual machine, without ensuring clock integrity.

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 later-kernel 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: version 2.7-2 is provided

2 – Oracle/Sun Microsystems MySQL **http://dev.mysql.com**

- version 5.0 or greater (we developed against version 5.1 and 5.0.4)

3 – Python Remote Objects “PYRO” **http://pyro.sourceforge.net**

- version 3.7 or greater
- note: version 3.15 is provided

4 - MySQL-Python **http://mysql-python.sourceforge.net**

- version 1.2 or greater
- note: version 1.2.3 is provided

5 – py-setproctitle for Python

- version 1.0 or greater **http://pypi.python.org/pypi/setproctitle/**
- note: version 1.1.3 is provided

6 – setuptools for Python

- version 0.6 or greater **http://pypi.python.org/pypi/setuptools**
- note: version 0.6-11 (*nix) and 0.6-12 (Win) provided.

7 – For your Windows based OPC Server (whether live machine or virtual machine)...

- PyWin32 for Windows version 2.14 or greater **http://pywin32.sourceforge.net**
- note: version 2.16 is provided

8 – Not Required, but Nice to Have...

- Oracle/Sun Virtual Box **http://www.virtualbox.org**
  (lets you host your OPC Server as a virtual server inside of your main OS / Server)

BE ADVISED!

- All required dependencies are included in the folders...
  - /mod_openopc_2/help/dependancies
    - /unix Linux and Unix source files
    - /win32 Win32 binaries (do not mix with 64)
    - /win64 Win64 binaries (do not mix with 32)

- If you do not already have one, or you have an incompatible one, there is a known working and free-ware (open-ware) Automation DLL (DCOM Interface) in the following folder...
  - /mod_openopc_2/help/dependancies
    - /automation_dll
      GrayBox DLL version 1.2.8-508

BASIC INSTALLATION

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

A legitimate and current source shall remain at:

http://download.spinellicreations.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
                        ./options
                        ./prog
                        ./server_reset
                        ./temp
```

While this is the age of 'security' and such, mod_openopc has not been tested or designed 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]
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_throttle]
GROUPBUILD_TIMEOUT_OVERRIDE:30
      # timeout value, in seconds.
      # -- suggested as 30 seconds or greater.

[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
      # do not modify unless building custom routine

[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

[gateway_reset]
GATEWAY_LIST_TO_RESET:thundercracker,30,24
      # define mod_openopc gateways to auto reset
      # -- form is GWNAME,DISCONNECT-DELAY,RECYCLE-FREQUENCY-IN-
      #    HOURS|GWNAME2,DISCONNECT-DELAY2,RECYCLE-FREQUENCY-IN-
      #    HOURS2
      # -- DO NOT use any spaces.
      # -- DO NOT use a trailing pipe.
      # -- for example...
      #     if you have 2 gws, gw1 and gw2, and you want to reset
      #     gw1 every 2 days with a delay of 30 seconds to allow
      #     clients to clean up, and gw2 every 1 day with a 60   second
      #     disconect delay, then you'll use...
      #           gw1,30,48|gw2,60,24
```

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 Gateway. 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]
      IP_OF_GATEWAY_FOR_SERVER:10.1.12.250
            # OPC SERVER IP ADDRESS
      SERVER_NAME:RSLinx OPC Server
            # OPC SERVER SOFTWARE NAME WHEN QUERIED
      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.
      SERVER_STOP_CMD_LINE_INPUT:net stop RSLinx
            # COMMAND ISSUED VIA COMMAND LINE (SHELL, POWER SHELL, DOS
            # PROMPT / ETC) ON REMOTE MACHINE TO STOP OR KILL THIS OPC
            # SERVER.
            #   - enter "none" if not using SERVER_RESTART_WITH_GATEWAY
      SERVER_START_CMD_LINE_INPUT:net start RSLinx
            # COMMAND ISSUED VIA COMMAND LINE (SHEL, POWER SHELL, DOS
            # PROMPT / ETC) ON REMOTE MACHINE TO START UP THIS OPC
            # SERVER.
            #   - enter "none" if not using SERVER_RESTART_WITH_GATEWAY
      SERVER_RESTART_WITH_GATEWAY:yes
            # WOULD YOU LIKE TO RESTART THIS SERVER (STOP / START)
            # ALONG WITH THE GATEWAY, WHEN DOING A GATEWAY_RESET ?
            #     - "yes" OR "no"
```

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 mod_openopc_2 in GATEWAY_DAEMON mode 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 is 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 (RSLinx, Kepware, Matrikon, etc...)

MAKE SURE YOUR OPC SERVER SOFTWARE IS SETUP AS A WINDOWS SERVICE! (else it must be manually started at boot PRIOR to mod_openopc in GATEWAY_DAEMON mode)

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 Automation DLL of your choice (if you have not already). If you do not have one, or do not have a supported DLL, you can use the included GrayBox DLL:

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

```
C:\>  cd C:\mod_openopc_2\help\dependancies\automation_dll
C:\>  regsvr32 graybox_opc_automation_v-1-2-8-508.dll
```

** Command is appropriate for Win2k / WinServer2003 / WinXP
** You should check for Win7 / WinServer2008 (PowerShell)

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

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.

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...* **

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 ports #7766 and #7767 are 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_bridge.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)
YOURSQLSERVER:modopenopc
      # SQL SERVER JUST FOR LOGGING FAULTS

[your_bridge]
YOURLEAFERS:XXX[MY_PLC_1]YYYF11:11&XXX[MY_PLC_1]YYYF11:41&|
YOURLEAFERS2:XXX[MY_PLC_2]YYYF11:48&XXX[MY_PLC_2]YYYF11:49&|
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]YYYTAG
      #      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
overrride =             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_space_bridge.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]YYYF11:11&XXX[MY_PLC_1]YYYF11:41&|
YOURLEAFERS2:XXX[MY_PLC_2]YYYF11:48&XXX[MY_PLC_2]YYYF11:49&|
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]YYYTAG
      #      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
overrride =             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_write.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]YYYTAG
      #      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_read.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]YYYTAG
      #     SUCH AS...
      #           MY_FAVORITE_PLC, TAG N7:42 would be
      #           listed as
      #           XXX[MY_FAVORITE_PLC]YYYN7:42
      #     FOR EXAMPLE...
      #           YOURLEAFERS:XXX[MY_PLC_1]YYYN7:20&
      #                             XXX[MY_PLC_1]YYYN7:21&|
```

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
```

Additionally, any 'READ' preset file may be modified with the addition of the following lines to the [your_server] section...

```
      YOURSQLCOLUMNDATESTAMP:DATESTAMP
            # case sensitive name of the column in your
            # mysql database which contains the datestamp
            # of records logged - this should be the first
            # column!
      YOURSQLCOLUMNLEAFNAME:MACHINENAME
            # case sensitive name of the column in your
            # mysql database which contains the leaf_name
            # (also called 'leaf_sql_name' or 'machine name')
            # of records logged - this should be the second
            # column, and will be easily identified as it is
            # the column where all of your OPC_TOPIC names
            # are logged.
```

This will allow you to call the 'READ' subroutine with the additional command line argument of 'UPDATE', for example...

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

Where...

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

Example real world call...

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

The result of the 'UPDATE' argument will be that only ONE record will be maintained for any given LEAFNAME (also called 'machine name' or 'leaf_sql_name' – this is the value of the OPC Topic name you declare in the list of values to be read). This is useful for HMI's or other interfaces where you are either already logging data in a different format, or you simply want to display a bunch of different data points that you do not necessarily want to record. When building HMI's – it is best to pair 'READ' (with 'UPDATE') along with 'WRITE_DAEMON' (where appropriate flat files are dumped as needed.

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 you may have a loaded system,
                        or a bottleneck somewhere.
```

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 deamon 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_read_daemon.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
      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 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 deamon 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_write_daemon.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
GATEWAY_RESET →

Peforms a systemwide, controlled, reset of the mod_openopc Gateway which runs on the guest (or other physical system) OS. This is used as a preventative measure   to deal with the pywin32-to-OPC Automation DLL memory leak under Windows. It is a workaround, not a fix.

In most installations, 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. 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 GATEWAY_RESET function can be 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 GATEWAY_RESET [opc_server_preset] [delay]
```

Example real world call...

```
[root@server] ./prog/mod_openopc.py  GATEWAY_RESET myopcserver1 25
```

Preset / Command
GATEWAY_RESET_DAEMON →

Auto-magically calls GATEWAY_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_preset] [delay] [recycle time]
```

Where...

```
opc_server_preset  =    name used for opc server *.opc
                  preset file, without extension.
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 mod_openopc Gateway.

*** 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 7767.*

*** 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 editing mod_openopc_common.py, 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 availabe commands, switches, and their structure. Similar to this section, but less fleshed out. It's you're 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 →

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

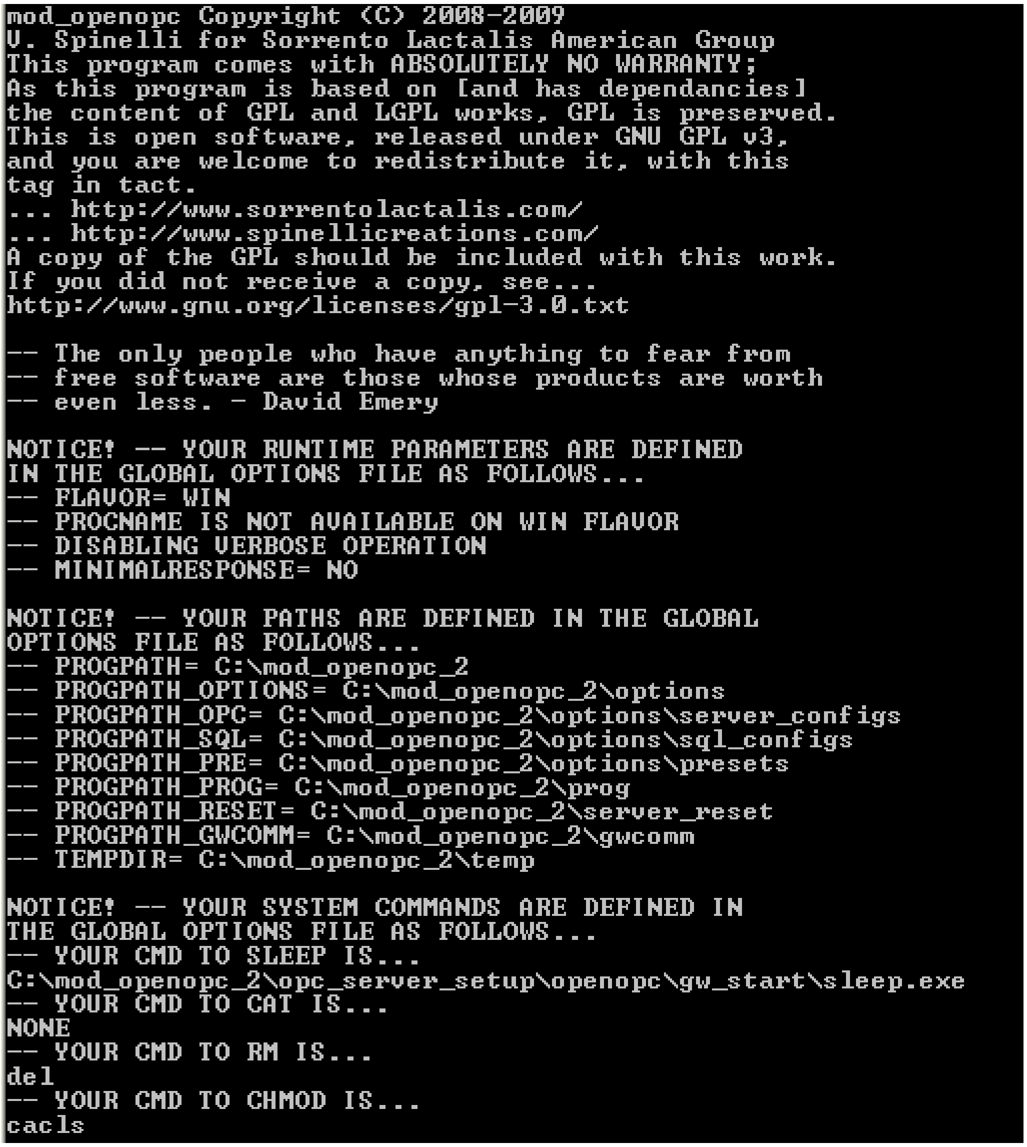
Structure...

```
[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 it **



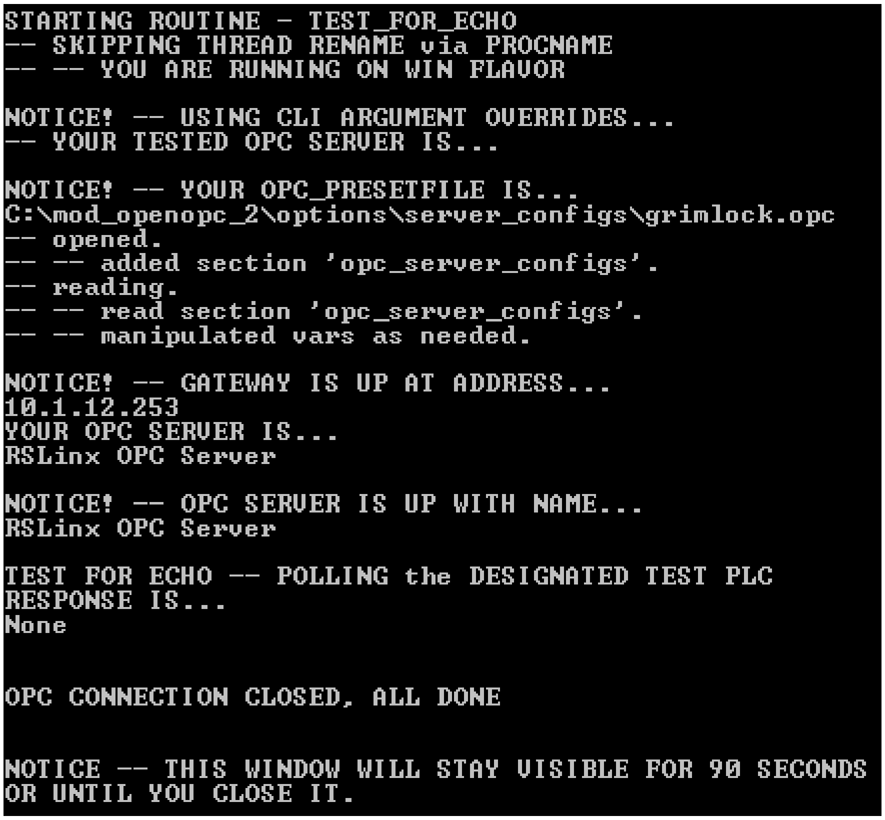
```
mod_openopc Copyright (C) 2008-2009
V. Spinelli for Sorrento Lactalis American Group
This program comes with ABSOLUTELY NO WARRANTY;
As this program is based on [and has dependancies]
the content of GPL and LGPL works, GPL is preserved.
This is open software, released under GNU GPL v3,
and you are welcome to redistribute it, with this
tag in tact.
... http://www.sorrentolactalis.com/
... http://www.spinellicreations.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 VERBOSE 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.
```

Preset / Command
SERVER_SEEK →

Peforms a a check for the SERVER_NAME(s) of OPC server software packages running on the same machine that the GATEWAY service is on. Sometimes, server software packages don't use common or simple names, and sometimes they're not consistent. The Windows Service, SERVER_NAME, and Administrative Tools entries do not necessarily match… so it is up to you to check (here) and be sure.

Structure...

```
[root@server] ./prog/mod_openopc.py  SERVER_SEEK [gateway IPv4 address or FQDN]
```

Example real world call...

```
[root@server] ./prog/mod_openopc.py  SERVER_SEEK 192.168.10.5
```

win32_bootup.py

Some users may choose to run mod_openopc GATEWAY service and client operations on the same operating system instance. Basically, this would be the case of an “all in one” machine, running everything. This has been accomplished, and can be easily reproduced, on systems running Windows Server 2008 (64 and 32 bit) and Windows 7 (64 and 32 bit). It *should* (but has not been tested to) work well with Windows Server 2012 and forward, as well. Your mileage may vary – the preferred environment is still a Unix / Linux deployment. However, the portability of Python makes this a no-brainer for small / stand-alone applications.

In order to facilitate this, we have to ensure that the GATEWAY_DAEMON and the AUTO_LAUNCH routine are started in the correct order and their persistence is ensured.

A simple script was created – located in the “prog” folder – and called “win32_bootup.py”.

Adding this script to your Windows Start Menu / Startup programs will ensure a trouble-free experience.

The shortcut (in your “Startup” list) should be:

```
C:\[path-to-python]\python.exe C:\mod_openopc_2\prog\win32_bootup.py RUN
```

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.spinellicreations.com/mod_openopc

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

  http://spinellicreations.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.
7	2011-12-19	#55	- addition of 'UPDATE' command line argument to 'READ' subroutine.
8	2012-01-19	#58	- complete program audit and restructure for unity.
9	2012-06-17	#61	- ability to reset OPC Server by declared command (as part of GATEWAY_RESET) to allow for flushing OPC Server of Zombie Groups (for misbehaving servers).
10	2016-07-19	#66	- addition of SERVER_SEEK command & win32_bootup.py script.