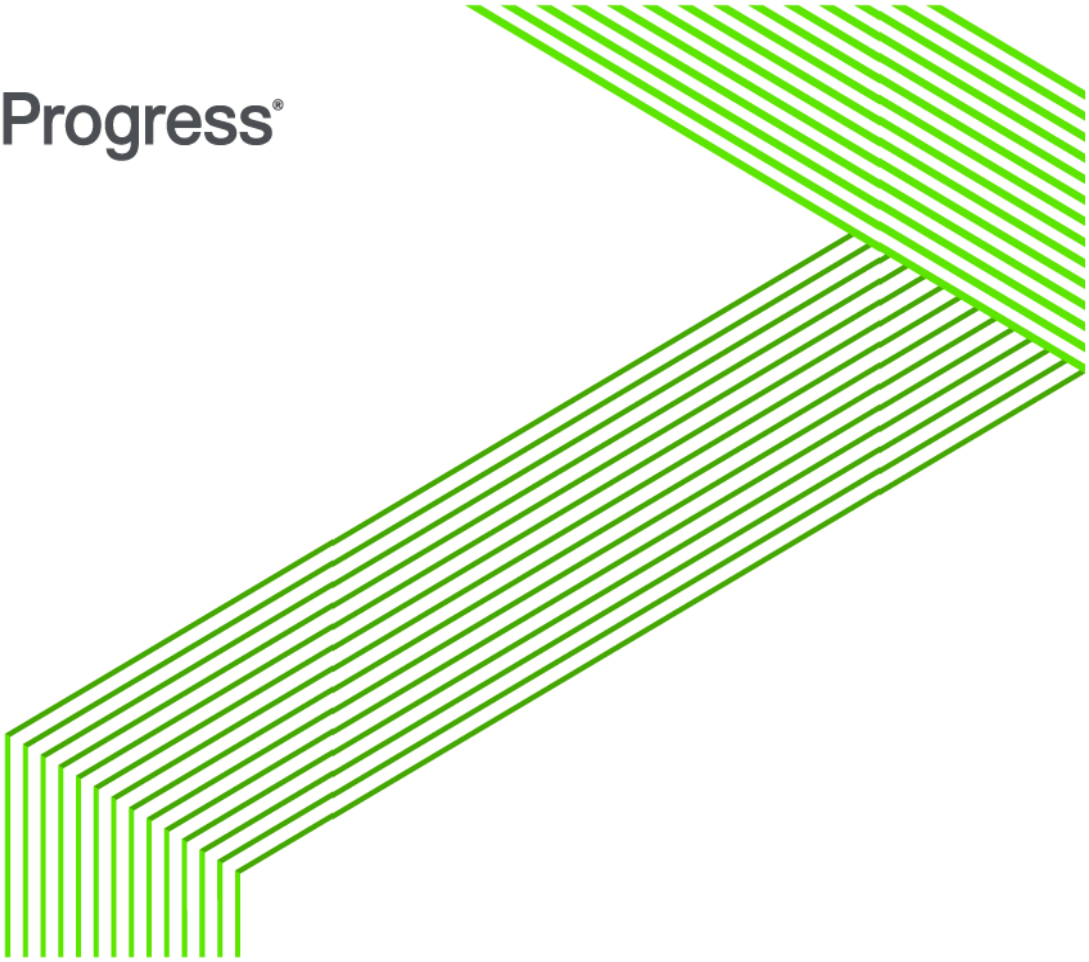

Progress® DataDirect® OpenAccess™ SDK 8.1

Debugging an IP

September 2016

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Debugging a C/C++ IP

Debugging on Windows

There are two methods to debug an IP on Windows:

- Attach to a running OpenAccess SDK service
- Launch the OpenAccess SDK service process from the debugger

The simplest method, which can be used for most of the cases, is to attach to a running OpenAccess SDK service. You must launch the OpenAccess SDK service from the debugger if you want to debug OAIP_init. This function is called during server initialization.

For the Local Client *for* ODBC, you can attach to the process that will be loading the ODBC driver or you can run the client application directly from the debugger.

On Windows, a connection from a client to a server that is being debugged may fail. Simply retry and the next connection will succeed.

Attaching to a Running Service

Assuming that you have stopped all services except the one you want to debug, attach to the process oasoa.exe from the debugger.

1. Stop the OpenAccessSDK810_C Service.
2. Verify that ServiceIPModule is set to the IP module being debugged.
3. Build the IP module in Debug mode.
4. Start the service from the OpenAccess SDK Management console.
5. From the debugger, attach to the process oasoa.exe.
6. Set a function break at OAIP_connectW/ OAIP_connect, or OAIP_execute.
7. Connect from an OpenAccess SDK client. Your break point at OAIP_connect is activated.
8. Execute a SQL statement: Breakpoint at OAIP_execute is activated

Launching an OpenAccess™ SDK Service from the Debugger

1. Stop the OpenAccessSDK810_C Service.
2. Verify that ServiceIPModule is set to the IP module being debugged.
3. Build the IP module in Debug mode.
4. Update the project settings to run the service that loads the IP module. Use the following Debugging settings:
   - Command: C:\Program Files\Progress\DataDirect\oaserver81\bin\oasoa.exe
   - Command Arguments: -debug -n OpenAccessSDK810_C -d "C:\Program Files\Progress\DataDirect\oaserver81\cfg\oadm.ini"
5. Start the service using **Debug / Start**. Breakpoint OAIP_init will be activated. Notice that the IP module is loaded.
6. Connect from a client. A breakpoint OAIP_connectW/ OAIP_connect is activated.

7. Execute a SQL statement: A breakpoint at OAIP_execute is activated.

Known Issue When Debugging on Windows

As documented in article Q173260 "PRB: Synchronization Failure When Debugging" in the Microsoft Knowledge Base, there are problems on Windows with synchronization while an application is running in a debug environment. Read the whole article at:

http://support.microsoft.com/kb/173260/

Due to this defect, connections to the OpenAccess SDK Server may fail with the following error in the server log file:

```
Wed Nov 28 13:21:36 2007:sched.swschd.3581.Internal error, fatal server
error detected.
Wed Nov 28 13:21:36 2007:Thread
Pooler.THRDP_StartTask.2243().4.Internal error.
Wed Nov 28 13:21:36 2007:Thread
Pooler.THRDP_AssignTask2Thread.1971().4.Internal error.
Wed Nov 28 13:21:36 2007:Thread
Pooler.THRDP_Thread_Start.3189().4.Internal error.
Wed Nov 28 13:21:36 2007:State
Synchroniser.STASYNC_WaitForStateChange.511().13.Internal error.
Timeout occurred on a wait operation.
```

To work around this type of problem while debugging a C/C++/NET IP with the OpenAccess SDK Server on Windows:

- Start oasoa.exe from the debugger with the –debug flag. When started with this flag enabled, oasoa.exe puts a Sleep(0) before each PulseEvent() or SetEvent() as suggested by Microsoft in there article Q173260 "PRB: Synchronization Failure When Debugging" at http://support.microsoft.com/kb/173260/
- Set ServiceInternalTimeOut to a value between 2000 to 5000 ms. The default value for this configuration parameter is 60000 ms. By using a lower value than 60000 ms, oasoa.exe recovers more quickly from any Windows Synchronization failure.
- Use the OpenAccess SDK trace function tm_trace(). Avoid using OutputDebugString().
- Set a function breakpoint at the IP entry point as OAIP_init, `OAIP_connectW`, `OAIP_execute`,… Avoid stopping execution of oasoa.exe using "Break All".

Debugging on UNIX

There are two methods to debug an IP on UNIX –

1. Attach to a running OpenAccess SDK service
2. Launch the OpenAccess SDK service process from the debugger

The simplest is to attach to a running OpenAccess SDK service and can be use for most cases. You must launch the OpenAccess SDK service from the debugger if you need to debug into OAIP_init. This function is called during server initialization.

Attach to an OpenAccess™ SDK Server with the Debugger

This method can be used for debugging most IP code.
Debugging steps:

1. Compile and link the IP module for debugging (-g). The setenvd.sh (or .csh) files that are supplied with the SDK set the correct flags. Make sure to disable any optimization.
2. Start the server, for example, using the ServiceStart oacla command.
3. Determinate pid of the server -- for example, use grep or pgrep.
4. Attach with dbx to this server.
5. Set a breakpoint in the IP code.
6. Continue execution of the server.
7. Use odbcisql, for example, to connect to the server and execute a SQL-statement to activate your breakpoint.

Example Debug Session with dbx on Solaris:

```
# start the server
$ /home/carl/oaserver810/admin/oacla.sh -l
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reserved
oacla>  ServiceStart OpenAccessSDK810_C
oacla> exit

# determinate pid of the server
$ ps -ef | grep oasoa
    carl  5190     1  0 17:15:27 ?        0:01
/export/home/carl/oaserver810/bin/oasoa -n OpenAccessSDK810_C -d
/export/home/car
    carl  5225  4260  0 17:16:39 pts/2    0:00 grep oasoa

# attach with dbx to this server

$ dbx - 5190
Reading oasoa
Reading ld.so.1
...
Reading oadamipmem.so
Attached to process 5190 with 4 LWPs
t@1 (l@1) stopped in _libc_poll at 0xfee9ae00
0xfee9ae00: _libc_poll+0x0004:  ta       8

 # set breakpoint in the ip-code to debug
(dbx) stop in OAIP_connectW
(2) stop in OAIP_connectW
(dbx) stop in OAIP_execute
(3) stop in OAIP_execute

#continue execution of the server
(dbx) cont
```

```
a client connects...

t@7 (l@7) stopped in OAIP_connectW at line 686 in file "mem_drv.c"
  686       char            sFunctionName[]="OAIP_connectW";
…
the client executes a query

@7 (l@7) stopped in OAIP_execute at line 917 in file "mem_drv.c"
 917       char            sFunctionName[]="OAIP_execute";
…
```

Example Debug Session with dbx on AIX

```
# start the server
$ /home/carl/oaserver810/admin/oacla.sh -l
```

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```
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oacla> ServiceStart OpenAccessSDK810_C
oacla> exit

# determinate pid of the server
$ ps -fu carl | grep oasoa
    carl 413906      1   0 14:57:30      -  0:00
/home/carl/oaserver810/bin/oasoa
 -n OpenAccessSDK810_C -d /home/carl/oaserver810/cfg/oadm.ini
    carl 430186 364778   1 14:58:45  pts/1  0:00 grep oasoa

# attach with AIX dbx to this server

$ dbx -a 413906
Waiting to attach to process 413906 ...
Successfully attached to oasoa.
warning: Directory containing oasoa could not be determined.
Apply 'use' command to initialize source path.

Type 'help' for help.
reading symbolic information ...
stopped in _event_sleep at 0xd005dec4 ($t4)
0xd005dec4 (_event_sleep+0xa8) 80410014        lwz   r2,0x14(r1)

# set breakpoint in the ip-code to debug
(dbx) stop in OAIP_connectW
[1] stop in OAIP_connectW
(dbx) stop in OAIP_execute
[2] stop in OAIP_execute

#continue execution of the server
(dbx) cont

a client connects...

[1] stopped in OAIP_connectW at line 710 in file "" ($t8)
```

```
could not read "src/mem_drv.c"

(dbx) use /home/carl/oaserver810/ip/oac/memory
(dbx) list
  710       char            sFunctionName[]="OAIP_connectW";
  711       MEM_ENV_DA      *pEnvDA = (MEM_ENV_DA *)henv;
  712       MEM_CONN_DA     *pConnDA;
  713       OAWCHAR         sExpectedDbName[]=OAL_WTEXT("memory");
  714       OAWCHAR         sExpectedUserName[]=OAL_WTEXT("pooh");
  715       OAWCHAR         sExpectedPassword[]=OAL_WTEXT("bear");
  716       OAWCHAR         wsBuf[MEM_WSBUF_LEN];
  717       int             iLen;
  718       int             iUserAuthentication = 1;
  719       int             iRetCode;
(dbx) where
OAIP_connectW(dam_hdbc = 0x20e19eb8, henv = 0x20ad7e68, pMemTree =
0x20b19f48, s
DatasourceName = 0x20e1a54e, sUserName = 0x20e1a0ca, sPassword =
0x20e53308, sCurrentCatalog = 0x20e1a650, sIPProperties = 0x20e1ab54,
sIPCustomProperties = 0x2
0e1fdde, phdbc = 0x20e1b63c), line 710 in "mem_drv.c"
sqldrv_connect() at 0xd5518f1c
OADS_connect() at 0xd5439850
SWANDB_Logon() at 0x101ca0d4
SWANLOGON_Logon() at 0x101ae39c
SWANSRVC_ExecLogon() at 0x1019a9c0
SWANSRVSSP_ExecChain() at 0x10205694
SWANSRVSSPDispatcher() at 0x10209c5c
SWANCONN_DoRPC() at 0x10021f50
SWANCONN_DoRPC() at 0x10021f50
SWANSCHED_DoRPCCB() at 0x10018fc4
SESMGR_Rpc_ServerSession_Callback() at 0x10156134
SESMGR_Rpc_ServerSession_DoRpc() at 0x10153974
SESMGR_DoRPC_137_126() at 0x101692ac
SWANSCHED_DoRPC() at 0x10014b88
ThreadMain() at 0x10216a2c

#dump unicode string sUserName in hex ( wchar_t is 2 bytes on AIX 32bit)
 (dbx) &sUserName[0] /8x
0x20e1a0ca:  0070 006f 006f 0068 0000 0000 0000 0000

#continue execution of the server
(dbx) cont
                              …
the client executes a query

[2] stopped in OAIP_execute at line 921 in file
"/home/carl/oaserver810/ip/oac/m
mory/src/mem_drv.c" ($t8)
  921       char            sFunctionName[]="OAIP_execute";
```

Example Debug Session with GNU gdb on Linux or with HP gdb on HP-UX

```
# start the server
$ /home/carl/oaserver810/admin/oacla.sh -l
```

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```
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oacla> ServiceStart OpenAccessSDK810_C
oacla> exit

# determinate pid of the server
$ ps -fu carl | grep oasoa
carl     28656     1  0 20:02 ?        00:00:00
/home/carl/oaserver810/bin/oasoa -n OpenAccessSDK810_C -d
/home/carl/oaserver810/cfg/oa
dm.ini
carl     28681 26786  0 20:03 pts/2    00:00:00 grep oasoa

# attach with gdb to this server
$ gdb -p 28656
GNU gdb Red Hat Linux (6.3.0.0-0.30.1rh)
Copyright 2004 Free Software Foundation, Inc.
GDB is free software, covered by the GNU General Public License, and
you
are welcome to change it and/or distribute copies of it under certain
conditions.
Type "show copying" to see the conditions.
There is absolutely no warranty for GDB.  Type "show warranty" for
details.
This GDB was configured as "i386-redhat-linux-gnu".
Attaching to process 28656
Reading symbols from /home/carl/oaserver810/bin/oasoa...done.
...
Reading symbols from /home/carl/oaserver810/ip/bin/liboadsdam.so...done.
Loaded symbols for /home/carl/oaserver810/ip/bin/liboadsdam.so
Reading symbols from /home/carl/oaserver810/ip/bin/oadamipmem.so...done.
Loaded symbols for /home/carl/oaserver810/ip/bin/oadamipmem.so
0x004f26cd in poll () from /lib/tls/libc.so.6
# set breakpoint in the ip-code to debug

(gdb) break OAIP_connectW
Breakpoint 1 at 0x5e3c8e: file src/mem_drv.c, line 710.
(gdb) break OAIP_execute
Breakpoint 2 at 0x5e4543: file src/mem_drv.c, line 921.
#continue execution of the server
(gdb) cont
Continuing.

a client connect...

[Thread 52853680 (LWP 29079) exited]
[New Thread 52853680 (LWP 29320)]
[Switching to Thread 52853680 (LWP 29320)]
```

```
Breakpoint 1, OAIP_connectW (dam_hdbc=0x9fde38c, henv=0x9f96974,
pMemTree=0x9fa4ad0,sDatasourceName=0x9fdee28,  sUserName=0x9fde5a0,
sPassword=0x9f992f0,  sCurrentCatalog=0x9fdf02c,  sIPProperties=0x9fdf634,
sIPCustomProperties=0x9fe52a4,
    phdbc=0x9fe091c) at src/mem_drv.c:710
710         char            sFunctionName[]="OAIP_connectW";

#dump unicode string sUserName in hex ( wchar_t is 4 bytes on Linux)
(gdb) x/8w sUserName
0x9fde5a0: 0x00000070   0x0000006f      0x0000006f      0x00000068
0x9fde5b0: 0x00000000   0x00000000      0x00000000      0x00000000

#continue execution of the server
(gdb) cont
Continuing.

the client execute a query

Breakpoint 2, OAIP_execute (hdbc=0x9fa4b24, hstmt=0x9fa36cc,
iStmtType=8, hSearchCol=0x0, piNumResRows=0x32673cc)
at src/mem_drv.c:921
921         char            sFunctionName[]="OAIP_execute";
(gdb)
```

Starting an OpenAccess™ SDK Server from the Debugger

This method of debugging has to be used when the OAIP_init() IP function that is called during the OpenAccess SDK server startup must be debugged.

Before debugging

- Compile and link the IP module in debug (-g flag). The setenvd.sh (or .csh) scripts that are supplied with the SDK set the correct flags. Make sure to disable optimization (-O flag).
- Make sure that the ServiceIPModule configuration attribute contains your IP module.
- Check the server is not running

Debugging steps

1. Set the library path environment variable to *install_dir*/bin. The name of the environment variable is LD_LIBRARY_PATH on Solaris and Linux, LIBPATH on AIX, SHLIB_PATH on HP-UX.
2. Export the environment variable OASDK_DEBUG_NOFORK.
3. Export OASDK_DEBUG_NOFORK=1.
4. Start the debugger with the OpenAccess SDK server image *install_dir*/bin/oasoa.
5. Set a breakpoint in OAIP_init().
6. Run the OpenAccess SDK sevice with the following options

   -debug -n <*ServiceName*> -d <*configfile*>

Example Debug Session with dbx on Solaris:

```
# export the needed environment variables
$ export LD_LIBRARY_PATH=/home/carl/oaserver810/bin
$ export OASDK_DEBUG_NOFORK=1
```

```
# start dbx with OpenAccess SDK server image
$ dbx /home/carl/oaserver810/bin/oasoa
Reading oasoa
Reading ld.so.1
....

#  preload your IP module you want to debug
(dbx) loadobject -load /home/carl/oaserver810/ip/bin/oadamipmem.so
Reading oadamipmem.so
Loaded loadobject: /home/carl/oaserver810/ip/bin/oadamipmem.so

#   set breakpoint in OAIP_init()
(dbx) stop in OAIP_init
(2) stop in OAIP_init

# start OpenAccess SDK service

(dbx) run -dbx -n OpenAccessSDK810_C -d
/home/carl/oaserver810/cfg/oadm.ini
Running: oasoa -dbx -n OpenAccessSDK810_C -d
/home/carl/oaserver810/cfg/oadm.ini
(process id 4726)
Reading en_US.ISO8859-1.so.2
Reading liboadsdam.so
Reading libw.so.1
t@1 (l@1) stopped in OAIP_init at line 246 in file "mem_drv.c"
  246       char            sUnicode[]="0";
(dbx) next
…
```

Example Debug Session with dbx on AIX

```
# export the needed env variables
$ export LD_LIBRARY_PATH=/home/carl/oaserver810/bin
$ export OASDK_DEBUG_NOFORK=1

#start dbx with openAccess SDK service image
# using  -I to passing the location of the IP-sources to debug.
$dbx -I /home/carl/oaserver810/ip/oac/memory
/home/carl/oaserver810/bin/oasoa

# set breakpoint in dlopen()
(dbx) stop in dlopen
[1] stop in dlopen

# start OpenAccess SDK server and stop whne dlopen() is called to load
the IP module
(dbx) run -debug -n OpenAccessSDK810_C -d
/home/carl/oaserver810/cfg/oadm.ini
[1] stopped in dlopen at 0xd02ac4c0 ($t1)
0xd02ac4c0 (dlopen)    bee1ffdc       stmw   r23,-36(r1)
(dbx) where
dlopen(0x2ff21be4, 0x4) at 0xd02ac4c0
SHLBLoad() at 0x1003ddf0
```

```
SWANDBSRVC_Init() at 0x101cba34
SWANSRVC_Init() at 0x101a4554
RealMain() at 0x1000134c
main() at 0x10000518
# load of liboadsdam.so, continue
(dbx) cont
[1] stopped in dlopen at 0xd02ac4c0 ($t1)
0xd02ac4c0 (dlopen)    bee1ffdc       stmw   r23,-36(r1)
(dbx) where
dlopen(0x2ff21480, 0x4) at 0xd02ac4c0
LoadLibrary() at 0xd5441af0
ipRegisterInterface() at 0xd558799c
dam_init_ip() at 0xd558a518
sqldrv_init() at 0xd551b89c
OADS_init() at 0xd543b034
SWANDBSRVC_Init() at 0x101cc54c
SWANSRVC_Init() at 0x101a4554
RealMain() at 0x1000134c
main() at 0x10000518
(dbx) 0x2ff21480/s
0x2ff21480: "/home/carl/oaserver810/ip/bin/oadamipmem.so"
#  loading  the IP-module
# set breakpoint in dlsym() and OpenAccess should call dlsym() for the
symbol "OAIP_init"
(dbx) stop in dlsym
[3] stop in dlsym
(dbx) status
[1] stop in dlopen
[3] stop in dlsym
(dbx) cont
[3] stopped in dlsym at 0xd02ac2d4 ($t1)
0xd02ac2d4 (dlsym)    93e1fffc       stw   r31,-4(r1)
(dbx) where
dlsym(0x3, 0x20b81f9c) at 0xd02ac2d4
GetProcAddress() at 0xd5441a80
ipRegisterInterface() at 0xd5587abc
dam_init_ip() at 0xd558a518
sqldrv_init() at 0xd551b89c
OADS_init() at 0xd543b034
SWANDBSRVC_Init() at 0x101cc54c
SWANSRVC_Init() at 0x101a4554
RealMain() at 0x1000134c
main() at 0x10000518
(dbx) 0x20b81f9c /s
0x20b81f9c: "OAIP_init"
# delete breakpoint in dlsym() and dlopen()
# set breakpoint in  OAIP_init()
(dbx) status
[1] stop in dlopen
[3] stop in dlsym
(dbx) delete 1
(dbx) delete 3
(dbx) stop in OAIP_init
[4] stop in OAIP_init
(dbx) cont
[4] stopped in OAIP_init at line 247 in file
"/home/carl/oaserver810/ip/oac/memory/src/mem_drv.c" ($t1)
```

```
  247       char            sUnicode[]="0";
(dbx) next
```

Other Tips

Viewing Debug Information Sent to stdout

If the service is started from the console, the debug information should be written to the tty. The service uses stdout of its parent process.

Where your printf-messages are written when the service is started in a "normal" way depends on:

- When your services are started up through the oaagent from a remote admin client, you see them in *install_dir*/logging/startOAAgent<pid>.log
- When your services are started up using the start-scripts in the *install_dir*/admin, you see them in *install_dir*/logging/startOAService<pid>.log
- When your services are started from the *install_dir* /admin/oacla, you see them on the tty.

To run the service in foreground, turn off the fork using "export OASDK_DEBUG_NOFORK=1".

You can use an analogous procedure as described in "Starting an OpenAccess™ SDK Server from the Debuggers" without the debugger as follows:

```
# export the needed env variables
$ export LD_LIBRARY_PATH=/home/carl/oaserver810/bin
$ export OASDK_DEBUG_NOFORK=1

 # start there OpenAccess SDK server image with the –debug flag,
servicename, and
 # Configfile
$ /home/carl/oaserver810/bin/oasoa -debug -n OpenAccessSDK810_C -d
/home/carl/oaserver810/cfg/oadm.ini
```

Avoid the use of printf() to write trace messages from an IP. Instead, use the OpenAccess SDK trace function tm_trace().

Stopping an OpenAccess™ SDK Server Being Debugged

Before stopping the server, always disable all breakpoints. You can then use the OpenAccess SDK Manager (Management Console or Command Line) to stop the server:

1. From the OpenAccess SDK Management Console:
   - Select the server to stop, and select Refresh .The server should become active.
   - Select the server to stop, and select Stop.
2. From the OpenAccess SDK Command Line (oasoa.exe or oasoa.sh), use the oacla command ServiceStop.

For example:
DataDirect OpenAccess SDK Manager Version .
8.1.0.0010

```
⌐ Copyright 1995-2016 Progress Software Corporation, All rights
reserved
oacla> ActivateLocalConfig
oacla> ServiceList
-----------------------------------------------------------------------
Name                          Host         Status    Description
-----------------------------------------------------------------------
OpenAccessSDK810_Agent        belg-carl7  active     Agent service
OpenAccessSDK810_C            belg-carl7  active     Service for C/C++
OpenAccessSDK810_Java         belg-carl7  inactive   Service for Java
OpenAccessSDK810_NET          belg-carl7  inactive   Service for .NET
OpenAccessSDK810_C_SQL        belg-carl7  inactive   Service for C/C++
OpenAccessSDK810_Java_SQL     belg-carl7  inactive   Service for Java
oacla> ServiceStop OpenAccessSDK810_C
oacla>
```

The oasoa –debug flag

In a typical service startup, either bin/oasoa or bin\oasoa.exe is started up by bin/oastrtr or bin\oastrtr.exe. The oastrtr executable exports the environment variables set in ServiceEnvironmentVariable before starting bin/oasoa or bin\oasoa.exe.

When bin/oasoa or bin\oasoa.exe is started directly from the command line or from the debugger, the service runs with just the environment variables set within the user's environment. However, the use of the –debug flag forces oasoa to read the ServiceEnvronmentVariable service attributes and set them for the process.

On Windows, the –debug flag also enables the PRB Q173260 workaround as explained in http://support.microsoft.com/kb/173260/

OpenAccess SDK Service Exit Codes

The following table lists the exit codes displayed when a service (oasoa) is started from the debugger or from the command line.

Code	Reason
10	oasoa is started without the required command arguments
11	The `-servicename` or `-n` option is missing the servicename argument
12	The `-connectmodel` or `-m` option is missing an argument
13	The `-sessionid` option is missing an argument
14	The `-connectinfo` option is missing an argument
15	The `-datamodel` or `-d` option is missing an argument
16	The `-msgfile` or `-g` option missing an argument
17	Missing the required servicename
18	Invalid value for connection model passed
	…
21	Cannot open the message file
22	Cannot open the configuration file
23	Configuration file has incorrect version
24	Servicename name was not found in configuration file
25	ServiceMessageFile attribute was not set in configuration file
	…
91	Internal error, memory allocation failed.
95	Internal error, fatal server error detected.

Examples of Common Startup Problems

```
$ dbx /home/carl/oaserver810/bin/oasoa
Type 'help' for help.
reading symbolic information ...warning: no source compiled with -g

# without argument
(dbx) run
 execution completed (exit code 10)

# without required servicename argument
(dbx) run -debug
 execution completed (exit code 17)

# without required configuration file argument
(dbx) run -debug -n OpenAccessSDK810_C
 execution completed (exit code 22)

# with incorrect servicename
(dbx) run -debug -n noneExistingService -d
/home/carl/oaserver810/cfg/oadm.ini
 execution completed (exit code 24)

# with incorrect configuration file
(dbx) run -debug -n OpenAccessSDK810_C -d /WrongDirectory/cfg/oadm.ini
   execution completed (exit code 22)
```

Debugging a .NET IP

You must use Visual Studio 2010 or higher to debug a .NET IP.

1. Build the IP module in Debug mode. Set break point in ipConnect.
2. Start the OpenAccessSDK810_NET Service from OpenAccess SDK Manager.
3. Select **Debug** / **processes**. Select **oasoa.exe** and click **Attach**.
4. From an OpenAccess SDK client, connect to your data source.
   The process should break in ipConnect.

You must restart the OpenAccess SDK service OpenAccessSDK810_NET after making any code changes.

Debugging a Java IP

This section provides a summary of using Eclipse to compile and debug a Java IP and a detailed procedure for creating an IP project in Eclipse and then debugging it.

Overview of Using Eclipse

This section summarizes the procedure for debugging using Eclipse. Refer to the *Detailed Procedure for Using Eclipse* section for a step by step procedure.

1. Setup project in Eclipse to build IP.
   a. Create SDK810 project. We will refer to the project location as *java_build_sdk810*.
   b. Select the Import option to import the IP files and oasql.jar.
      I. Select the directory as *install_dir*\ip
      (for example: C:\Program Files\Progress\DataDirect\oaserver81\ip).
      II. Expand the directory tree and select the oajava and oajava\ip folders. This selects the oajava\oasql.jar and oajava\ip*.java files. This will create the oajava folder under {java_build_sdk810}
      III. Select Project properties and modify settings in Java Build Path. In the Libraries tab, Select **Add external JARs** and select *java_build_sdk810*\oajava\oasql.jar
      IV. Complete the build.
2. Configure a Service to run JVM to allow remote debugging.
   a. Open the OpenAccess SDK Management Console and select **IP Parameters** under the OpenAccessSDK810_Java service.
   b. Create an attribute ServiceJVMOptions with the following values:
   -Xrunjdwp:transport=dt_socket,address=9003,server=y,suspend=n -Xdebug
3. Open the OpenAccess SDK Management Console and select **IP Parameters** under the OpenAccessSDK810_Java service. Select the attribute "ServiceJVMClassPath" (if it doesn't exist, create one) and add the current workspace directory (*java_build_sdk810*\SDK810) along with *install_dir*\ip\oajava\oasql.jar and any additional elements required by your IP. Remove the *install_dir*\ip entry.

4. Save the settings and Restart/Start OpenAccessSDK810_Java Service.
5. Connect from an OpenAccess SDK client and verify that the data source is working correctly.
6. Configure Eclipse to Debug.
   - Select Debug / Debug As… Select Remote Java Application.
   - Create new Debug profile called SDK810.
   - Set Host:localhost and Port:9003. (This Port number comes from the address value in step 2b.
7. Set a breakpoint in ipExecute or anywhere in the code where you need to debug.
8. Connect from the Client and Run query. Eclipse should allow you to debug the IP.

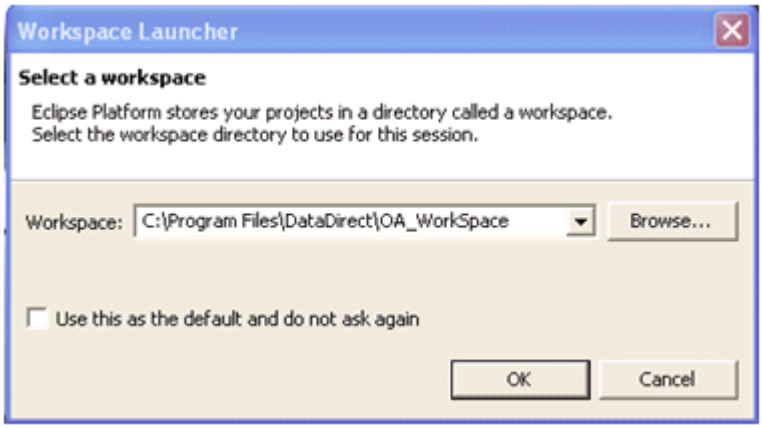
After recompiling the code, you must restart the service in order to load the newly complied class file.

Detailed Procedure for Using Eclipse

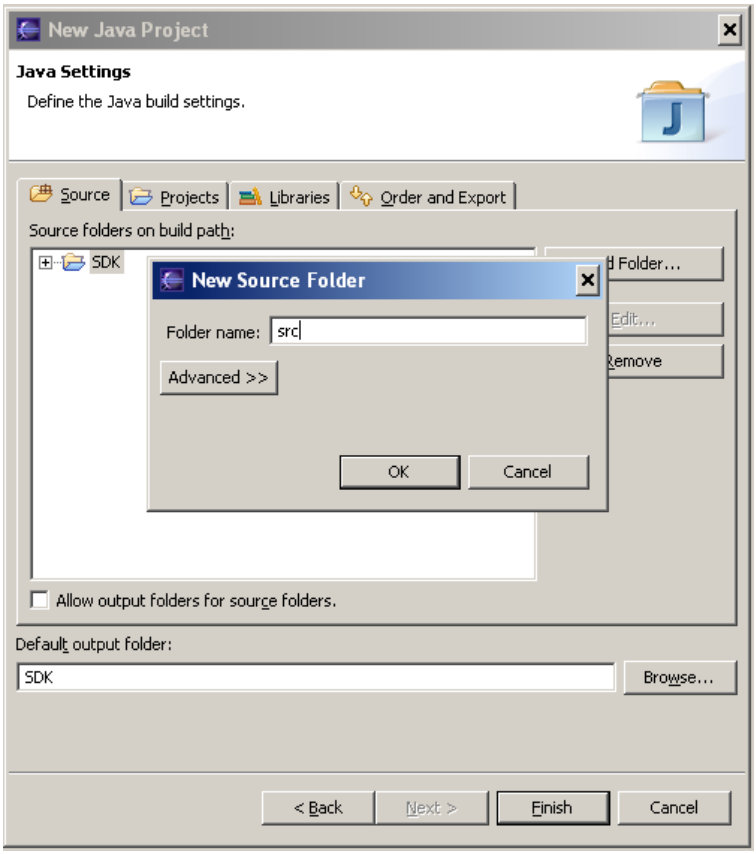
Loading/Compiling an IP thru Eclipse

This section provides a procedure for working with Eclipse 3.0.

1. Launch Eclipse.
2. Create / Select Workspace.
   Create a new project by selecting **File / New / Project** and choosing **Java Project**. Name the project SDK. Use the setting as shown in the following figure and then click **Next**.

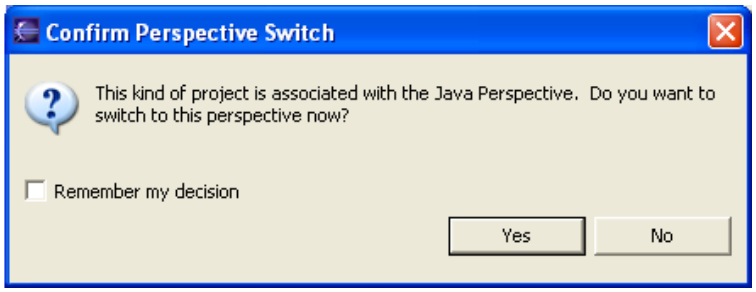


3. Select **SDK** and then select **Add Folder**. Type `src` under Folder Name and then click **OK**.

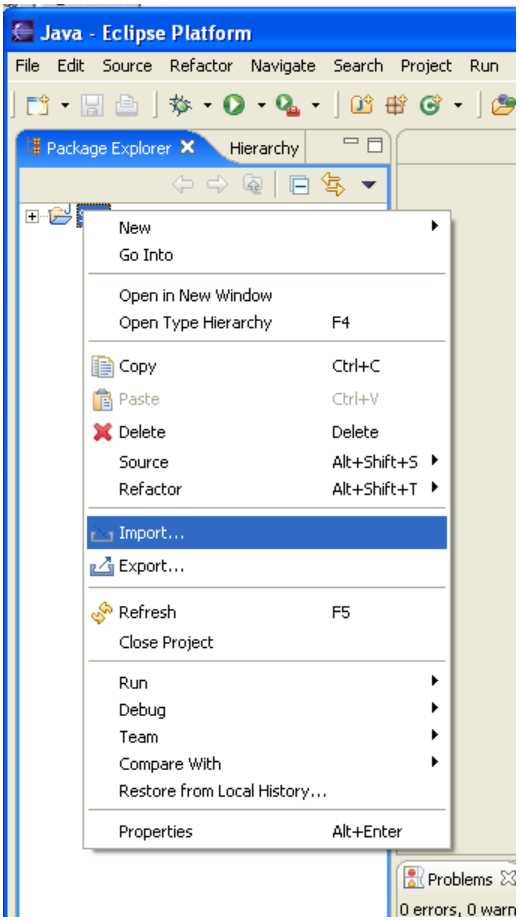


4. The Source Folder Added dialog box appears. Select **No**.

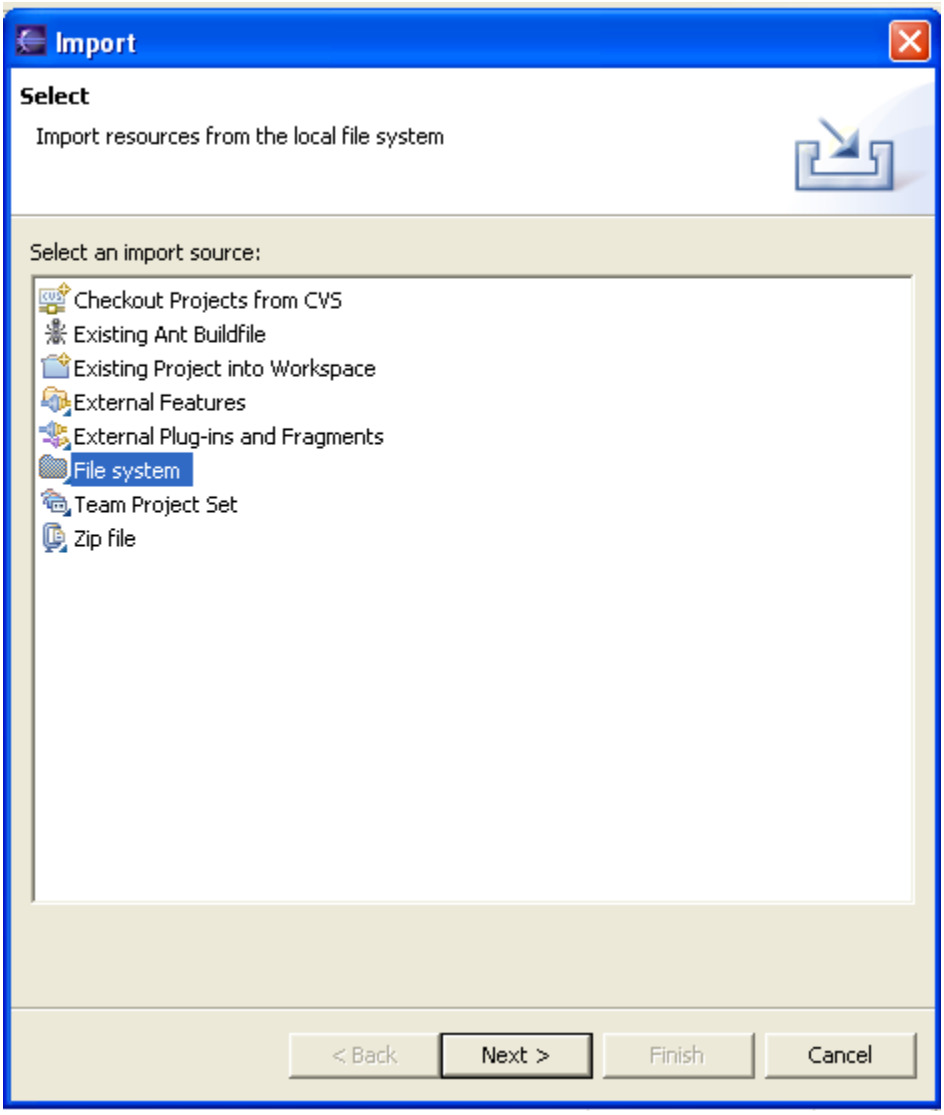
5. Click **Finish**. A confirmation window appears. Click **Yes.**



6. Go to the Eclipse window. Under Package Explorer Tab, right-click **SDK.** Select **Import.**



7. Select **File system** and click **Next**.



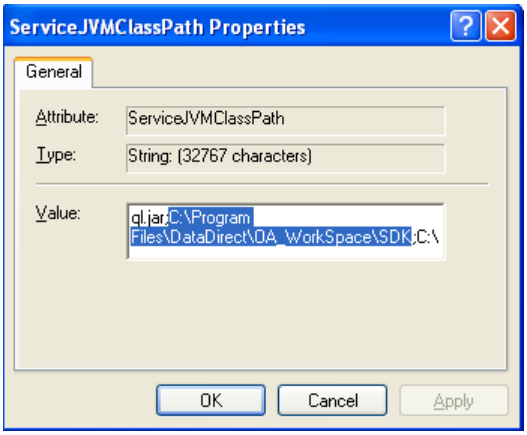
8. Under "From Directory", browse to C:\Program Files\Progress\DataDirect\oaserver81\ip and select the example to run. Then, click **Finish**.

   Make sure that the name under SDK tree matches with the package name in the java file, for example, "oajava.example1".

9. Select **Project-/ Properties** and select **Java Build Path**. Click the **Libraries** tab and click **Add External JARs**. Choose *install_dir*\oaserver\ip\oajava\oasql.jar.

   The preceding steps create an Eclipse project called SDK. Now you need to configure the OpenAccess SDK Service to use the IP classes that will be compiled using this Eclipse project.

10. Open the OpenAccess SDK Management Console and select **IP Parameters** under OpenAccessSDK810_Java service. Select the ServiceJVMClassPath attribute and add the current workspace folder (C:\Program Files\DataDirect\OA_WorkSpace\SDK) as the first element. Remove the *install_dir*\ip entry to ensure that the IP code is picked up from the Eclipse workspace. The ServiceJVMClassPath attribute should have *install_dir*\ip\oajava\oasql.jar, c:\Program File\DataDirect\OA_WorkSpace\SDK, and any others elements required by your IP.



If the preceding attribute does not exist, then create one.

11. Select the ServiceJVMOptions attribute. If the attribute does not exist, then create it and set its value to:
"-Xrunjdwp:transport=dt_socket,address=9003,server=y,suspend=n -Xdebug".

Record the port number (9003 in this example). You will need it to connect from Eclipse during the remote debug sessions.

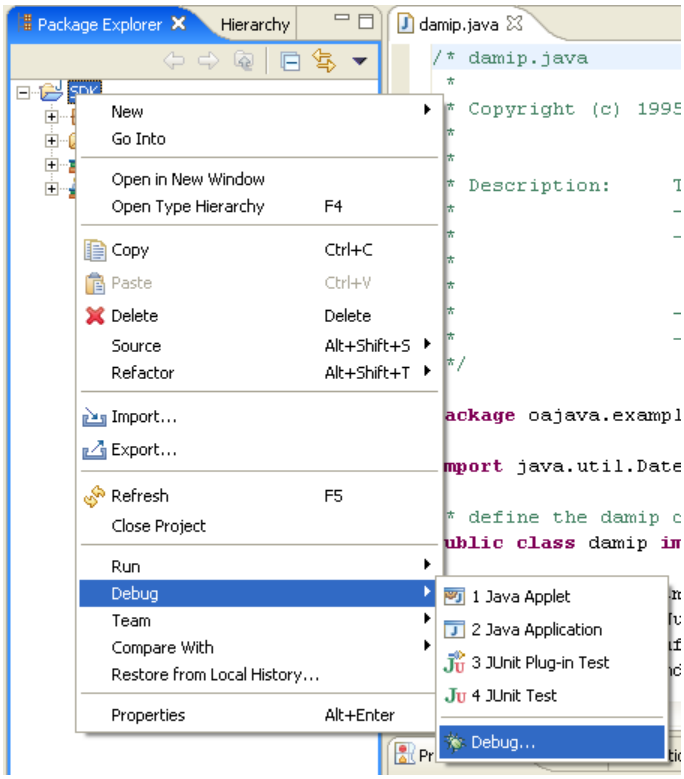
12. Save the settings of the OpenAccess Management Console and start the OpenAccessSDK810_Java service.

13. From an OpenAccess SDK client, connect to this service and the data source configured under it for your IP. This step is to make sure the Java environment is set up correctly.

NOTE: Every time you create a new project or compile the project, you must restart the OpenAccessSDK810_Java service to load the new class.

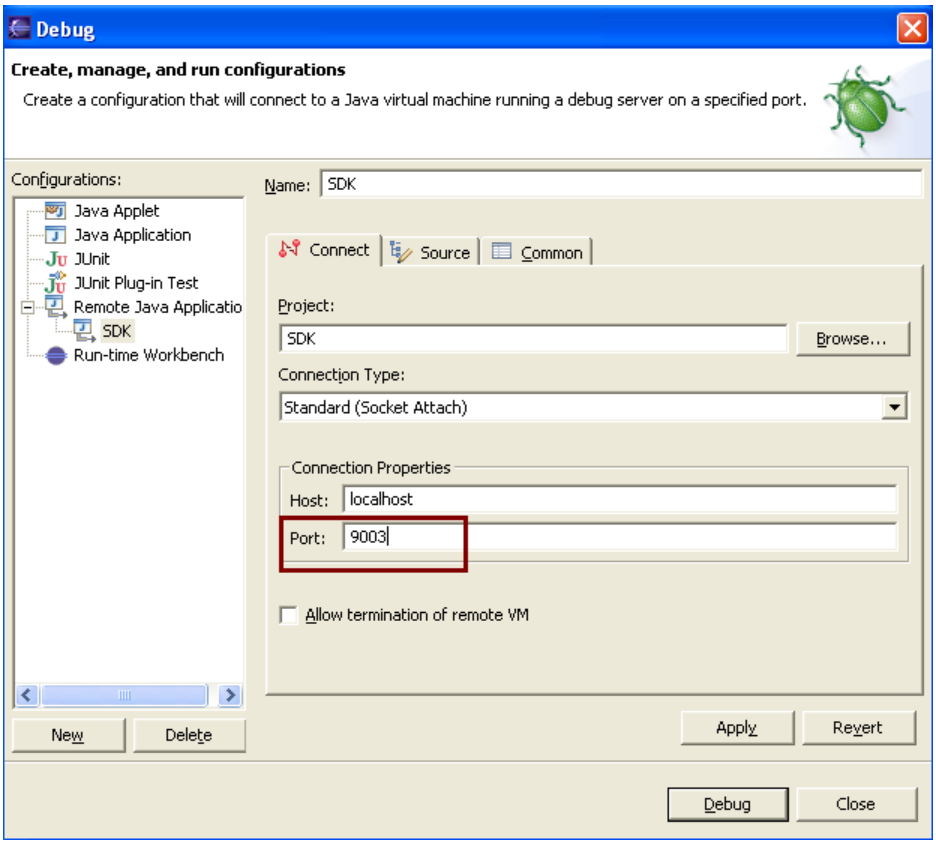
Debugging Using Eclipse

1. Move to an Eclipse window. Right-click the SDK under Package Explorer and select **Debug-/Debug.**



2. Under Configurations, select **Remote Java Application** and click **New**.

3. Change the port number in the new window to the one recorded in step 13 and click **Debug**.



4. Set breakpoints in the IP code.

5. From an OpenAccess SDK client, connect to the data source this IP code is tied to. Eclipse should break at the breakpoints.

   NOTE: Every time you create a new project or compile the project, you must restart the OpenAccessSDK810_Java service to load the new class.

Tip: Use Windows Authentication

Configure the OpenAccess SDK Agent on Windows for single sign-on and the administrator clients will not ask for a username and password.

To do this, add Kerberos or integrated_nt to ServiceAdminAuthMethods attribute and add the users authorized to connect to this Agent to the ServiceAdministrator attribute.

Example:

```
oacla> ServiceAttributeAdd OpenAccessSDK810_Agent
ServiceAdminAuthMethods integrated_nt

oacla> ServiceInfo OpenAccessSDK810_Agent
-----------------------------------------------------------------
  Configuration information for OpenAccessSDK810_Agent
-----------------------------------------------------------------
  Administration Security
  -----------------------
    ServiceAdminAuthMethods[0]: OSLogon(UID,PWD)
    ServiceAdminAuthMethods[1]: integrated_nt
    ServiceAdministrator[0]: EMEA\carl
```

Notice that the preceding configuration includes two entries for ServiceAdminAuthMethods. The administrator clients use integrated_nt for as the authentication method, because authMethod integrated_nt is more secure than authMethod OSLogon(*UID,PWD*)

In addition, in this configuration, only the user ‘EMEA\carl’ is allowed access to the Agent, because this is the only user defined in the ServiceAdministrator attribute.

Third Party Acknowledgments:

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