

Non-intrusive methods for debugging and problem analysis in multi-user high concurrency production OPA environments



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Assumptions/Scope/Disclaimer

- Assumption: Audience has a basic understanding of the OC 4.5.x architecture
- Scope: OC/RDC/TMS/AERS 4.5.x.
- Disclaimer: These methods are for debugging production environment problems. They are not intended for bypassing security measures or regulatory policies, and nothing in this presentation should be construed as intended for such purposes.



Requirements for Non-intrusive Debugging Within Production OLS environments.

- OLS production environments, especially those running RDC or with a global user base, have close to 24x7 usage and availability requirements.
- This type of environment increasingly presents problems and issues which must be debugged and analyzed in the production environment due to
 - critical time constraints
 - dependency on production infrastructure or components which are part of the issue
 - dependency on production data which does not exist elsewhere



Requirements for Non-intrusive Debugging Within Production OLS environments. (2)

- While creating refreshed copies/clones of the production environment and reproducing a production issue is the best analytical method, it is not always practical because:
 - Production environments are more complex and sometimes can not be duplicated 100% in their entirety in a test environment (such as load balanced servers, public-facing network components, secure data)
 - Sufficient infrastructure (such as disk space and servers) may not exist to make copies of the production environment
 - Downtime may be required to create production copies which may not be available
 - System Administrator/DBA/Application Administrator resources and availability may not exist or may not be available in time



Requirements for Non-intrusive Debugging Within Production OLS environments. (3)

- Executing many debugging techniques as documented can:
 - Cause short outages/downtimes which impact multiple users
 - Negatively impact performance for all users
 - Generate an excessive amount of debugging information/large logs, making it difficult to isolate a problem
- Having a way to debug a specific user's issue without effecting the production environment performance, causing downtime, or generating excessive debug files is a tremendous advantage in a production environment



Non-intrusive debugging at the database level

- There are well-known methods for debugging a specific user's database session with bind variables without affect any other database sessions.
- This method consists of the following well-known steps.
- Bring application right to the brink of the error/failure.
- Identify the sid, serial#, username from v\$session:
 - Select sid, serial#, username, program from v\$session where username = '<user>';



Non-intrusive debugging at the database level (2)

- Start the tracing:
 - `sys.dbms_system.set_ev(<SID>,<SERIAL#>,10046,12,")`
or
 - execute `sys.dbms_support.start_trace_in_session (sid => <SID>, serial => <SERIAL#>, waits => true, binds => true)`
- Actually cause the error to occur. Perform the action that causes the failure.
- Do NOT close the dialogue box for the error message (if present)
- Stop the tracing:
 - `sys.dbms_system.set_ev(<SID>,<SERIAL#>,10046,0,")`
or
 - execute `sys.dbms_support.stop_trace_in_session (sid => <SID>, serial => <SERIAL#>);`



Non-intrusive debugging at the database level (3)

- Check the USER_DUMP_DEST area for a current trace file.
 - `select name from v$parameter where name = 'user_dump_dest';`
- Copy the trace file into a temporary directory.
- Generate a record file with the order of executed SQL statements using tkprof:
 - `tkprof <trace>.trc <trace>.out record=<trace>.rec`
- Analyze the trace file and output accordingly



Examples of higher impact debugging/analysis methods:

- Excellent Metalink Note 275927.1: Troubleshooting RDC 4.5 PDF Data Entry Issues.
- Section 3.2.2.1 requires a registry key on the middle tier, which will generate a .dbg file for every user once these registry key is entered

3.2.2.1 Create the OPA_DCAPI_PDF_DEBUG String Value

In order to enable collection of the DCAPI debug logs for PDF data entry, you must create a new string value in the Windows registry on middle tier computer. The new entry resides in the same key as the OPA_XML_LOC string value. Typically, this location is HKEY_LOCAL_MACHINE\SOFTWARE\Oracle. In order to enable API debugging, set the data value for this new string to "Y".

- This will effect multiple sessions on the server making them slower and generate multiple sets of .dbg logs
- Also, any case where a modification to formsweb.cfg is required will then require the OracleiSuitesHTTPServer Service to be restarted, which will disconnect all OC/TMS/RDC users in version 4.5.x because forms servlets are in use.



Isolating changes to formsweb.cfg to a single user

- Nearly any change to %ORACLE_806_HOME%\forms60\server\formsweb.cfg and %OPA_HOME%\html\opa45_basejini.htm can be tested on an individual user basis **without** impacting the entire middle tier or **without** restarting the OracleiSuitesHTTPServer service.
- All parameters which are these two files are dynamically combined to create an .html file which is hiding in the "Please do not close this window..."

```

formsweb.cfg - Notepad
File Edit Format View Help
; 1282005_44043PM : Configuration for OPA 4.5.0 products

; Common OPA configuration
HTMLdelimiter=%
MetricsServerPort=9020
MetricsServerErrorURL=
HTMLbodyAttrs=
HTMLbeforeForm=<b>%FORMS60_PATH%</b>
HTMLafterForm=
splashScreen=no
serverPort=9000
jinit_classid=clsid:e79bc654-8fc6-4bb9-bfb8-8860779ae213
jinit_exename=jinit.exe#version=1,1,8,24
jinit_mimetype=application/x-jinit-applet;version=1.1.8.24
; jinit_classid=clsid:b5859259-c40b-4b2a-af9d-3bf0f634b1d5
; jinit_exename=jinit.exe#version=1,1,8,21
; jinit_mimetype=application/x-jinit-applet;version=1.1.8.21

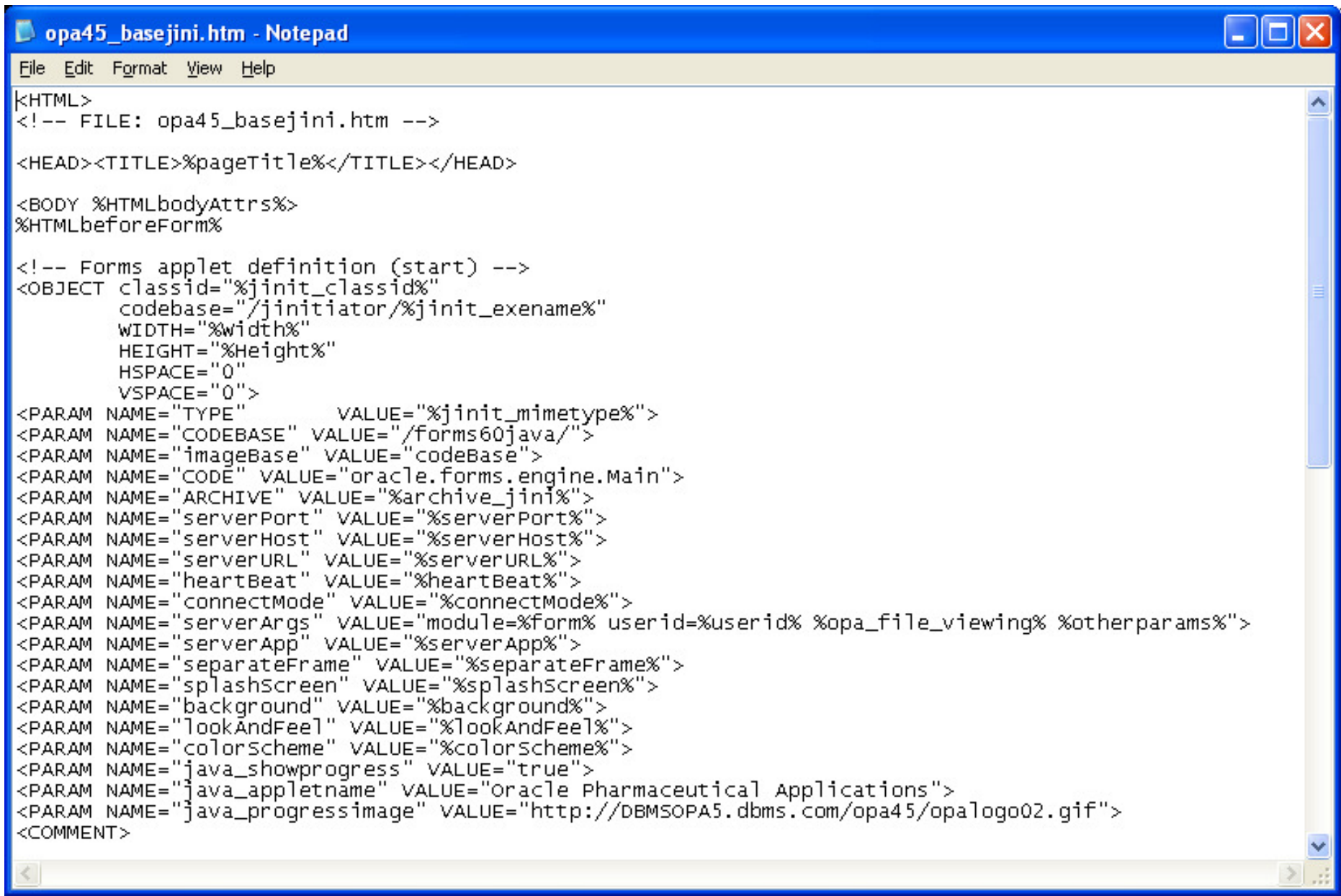
heartBeat=7
serverHost=DBMSOPA5.dbms.com
connectMode=Socket
jinit_download_page=/opa45/opa45_download.htm
separateFrame=True
lookAndFeel=oracle
colorScheme=blue
background=no
opa_file_viewing=PSUBMAP=UNC RSMAP=UNC

; OC & TMS Section
[opa45]
baseHTMLJInitiator=c:\opapps45\html\opa45_basejini.htm
baseHTMLie=baseie.htm

; The following two parameters only apply when using the Listener servlet.
; workingDirectory defaults to <oracle_home>/forms60 if unset.

workingDirectory=
envFile=
serverURL=/servlet/opaServlet
serverApp=opa45
archive_jini=pharmaewt.jar,f60all_jinit.jar,opaicons.jar,opaspell.jar,opa_client.jar,oc1
icons.jar,pharmacjle.jar,pharmacgle.jar,xmlcomp.jar,xmlparserv2.jar,jle2-0-3.jar,tmsic
ons.jar
form=opamenu.fmx term=c:\opapps45\opa\opa45_fmrpcweb.res de_gridwidth=7 de_gridheight=18
otherparams=
width=1000
height=1000
pageTitle=Oracle Pharmaceutical Applications

```



```
opa45_basejini.htm - Notepad
File Edit Format View Help
<HTML>
<!-- FILE: opa45_basejini.htm -->

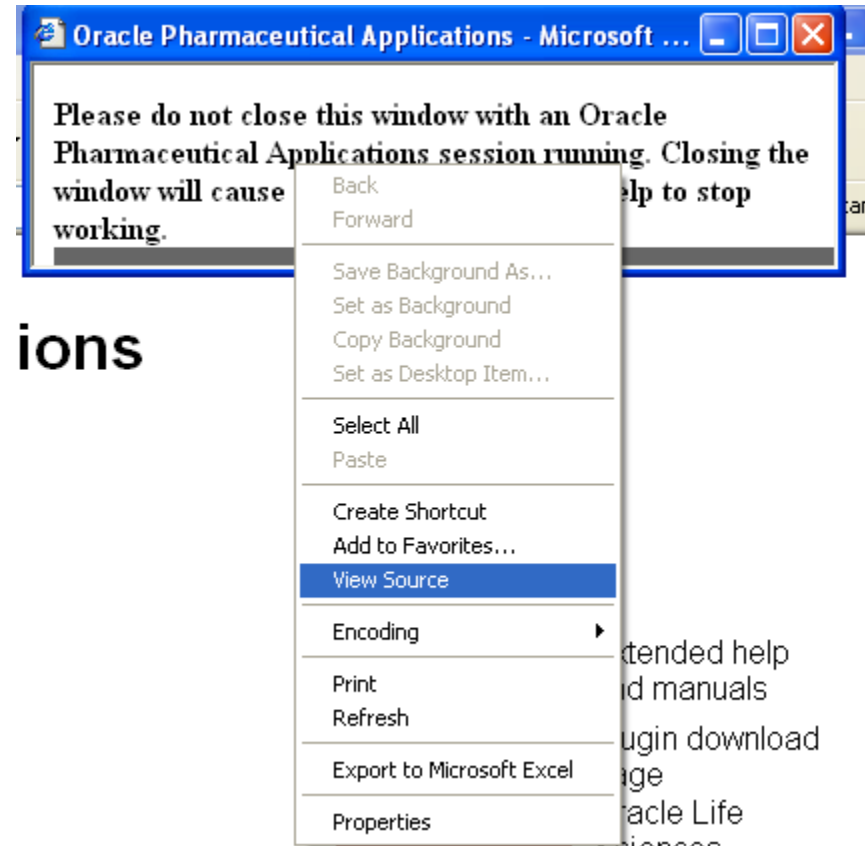
<HEAD><TITLE>%pageTitle%</TITLE></HEAD>

<BODY %HTMLbodyAttrs%
%HTMLbeforeForm%

<!-- Forms applet definition (start) -->
<OBJECT classid="%jinit_classid%"
        codebase="/jinitiator/%jinit_exename%"
        WIDTH="%width%"
        HEIGHT="%height%"
        HSPACE="0"
        VSPACE="0">
<PARAM NAME="TYPE" VALUE="%jinit_mimetype%">
<PARAM NAME="CODEBASE" VALUE="/forms60java/">
<PARAM NAME="imageBase" VALUE="codeBase">
<PARAM NAME="CODE" VALUE="oracle.forms.engine.Main">
<PARAM NAME="ARCHIVE" VALUE="%archive_jini%">
<PARAM NAME="serverPort" VALUE="%serverPort%">
<PARAM NAME="serverHost" VALUE="%serverHost%">
<PARAM NAME="serverURL" VALUE="%serverURL%">
<PARAM NAME="heartBeat" VALUE="%heartBeat%">
<PARAM NAME="connectMode" VALUE="%connectMode%">
<PARAM NAME="serverArgs" VALUE="module=%form% userid=%userid% %opa_file_viewing% %otherparams%">
<PARAM NAME="serverApp" VALUE="%serverApp%">
<PARAM NAME="separateFrame" VALUE="%separateFrame%">
<PARAM NAME="splashScreen" VALUE="%splashScreen%">
<PARAM NAME="background" VALUE="%background%">
<PARAM NAME="lookAndFeel" VALUE="%lookAndFeel%">
<PARAM NAME="colorScheme" VALUE="%colorScheme%">
<PARAM NAME="java_showprogress" VALUE="true">
<PARAM NAME="java_appletname" VALUE="Oracle Pharmaceutical Applications">
<PARAM NAME="java_progressimage" VALUE="http://DBMSOPA5.dbms.com/opa45/opa45logo02.gif">
<COMMENT>
```

Viewing Combined Source of formsweb.cfg and opa45_basejini.htm

- Right-Clicking on the “Please do not close this window ...” and choosing View Source will show the combined contents of opa45_basejini.htm with all variables substituted from formsweb.cfg as shown on the next slide




```

f60servlet[1] - Notepad
File Edit Format View Help
<!-- FILE: opa45_basejini.htm -->
<HEAD><TITLE>Oracle Pharmaceutical Applications</TITLE></HEAD>
<BODY >
<b>Please do not close this window with an Oracle Pharmaceutical Applications session running. Closing the
window will cause report/file viewing and help to stop working.</b>
<!-- Forms applet definition (start) -->
<OBJECT classid="clsid:e79bc654-8fc6-4bb9-bfb8-8860779ae213"
codebase="/jinitiator/jinit.exe#version=1,1,8,24"
WIDTH="1000"
HEIGHT="1000"
HSPACE="0"
VSPACE="0">
<PARAM NAME="TYPE" VALUE="application/x-jinit-applet;version=1.1.8.24">
<PARAM NAME="CODEBASE" VALUE="/forms60java/">
<PARAM NAME="imageBase" VALUE="codeBase">
<PARAM NAME="CODE" VALUE="oracle.forms.engine.Main">
<PARAM NAME="ARCHIVE"
VALUE="pharmaewt.jar,f60all_jinit.jar,opaicons.jar,opaspell.jar,opa_client.jar,oclicons.jar,pharmaocjle.jar
,pharmaocgle.jar,xmlcomp.jar,xmlparserv2.jar,jle2-0-3.jar,tmsicons.jar">
<PARAM NAME="serverPort" VALUE="9000">
<PARAM NAME="serverHost" VALUE="DBMSOPA5.dbms.com">
<PARAM NAME="serverURL"
VALUE="/servlet/opaServlet?ifcfs=/servlet/f60servlet?config=opa45&HTMLbeforeForm=<b>Please%20do%20not%20clo
se%20this%20window%20with%20an%20Oracle%20Pharmaceutical%20Applications%20session%20running.%20%20Closing%2
0the%20window%20will%20cause%20report/file%20viewing%20and%20help%20to%20stop%20working.</b>&acceptLanguage
=en-us">
<PARAM NAME="heartBeat" VALUE="7">
<PARAM NAME="connectMode" VALUE="Socket">
<PARAM NAME="serverArgs" VALUE="module=opamenu.fmx term=c:\opapps45\opa\opa45_fmrcpweb.res de_gridwidth=7
de_gridheight=18 userid= PSUBMAP=UNC RSMAP=UNC ">
<PARAM NAME="serverApp" VALUE="opa45">
<PARAM NAME="separateFrame" VALUE="True">
<PARAM NAME="splashScreen" VALUE="no">
<PARAM NAME="background" VALUE="no">
<PARAM NAME="lookAndFeel" VALUE="oracle">
<PARAM NAME="colorScheme" VALUE="blue">
<PARAM NAME="java_showprogress" VALUE="true">
<PARAM NAME="java_appletname" VALUE="Oracle Pharmaceutical Applications">
<PARAM NAME="java_progressimage" VALUE="http://DBMSOPA5.dbms.com/opa45/opa45_opalogo02.gif">
<COMMENT>
<EMBED SRC="" PLUGINS PAGE="/opa45/opa45_download.htm"
TYPE="application/x-jinit-applet;version=1.1.8.24"
java_codebase="/forms60java/"
imageBase="codeBase"
java_code="oracle.forms.engine.Main"

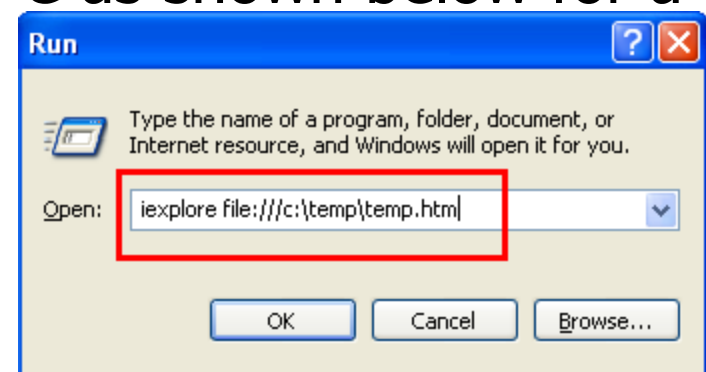
java_archive="pharmaewt.jar,f60all_jinit.jar,opaicons.jar,opaspell.jar,opa_client.jar,oclicons.jar,pharmaoc
jle.jar,pharmaocgle.jar,xmlcomp.jar,xmlparserv2.jar,jle2-0-3.jar,tmsicons.jar"
WIDTH="1000"
HEIGHT="1000"
HSPACE="0"
VSPACE="0"
serverPort="9000"
serverHost="DBMSOPA5.dbms.com"
serverApp="opa45"

```

Creating a static .html file to call OC/TMS/RDC



- Once the source is available, it can be saved locally.
- In this form, it will not run because it has relative Middle Tier server path references, and these must be substituted in order for the file to be useful.
- The source also contains an unnecessary section at the bottom of the file which has been kept for support of Netscape browsers.
- This new edited file should then be saved locally.
- It can be called directly from the PC as shown below for a file saved as `c:\temp\temp.htm`




```

<HTML>
<!-- FILE: opa45_basejini.htm -->
<HEAD><TITLE>Oracle Pharmaceutical Applications</TITLE></HEAD>
<BODY >
<b>Please do not close this window with an oracle Pharmaceutical Applications session running. Closing the
window will cause report/file viewing and help to stop working.</b>
<!-- Forms applet definition (start) -->
<OBJECT classid="clsid:e79bc654-8fc6-4bb9-bfb8-8860779ae213"
codebase="http://dbmsopa5/jinitiator/jinit.exe#version=1,1,8,24"
WIDTH="1000"
HEIGHT="1000"
HSPACE="0"
VSPACE="0">
<PARAM NAME="TYPE" VALUE="application/x-jinit-applet;version=1.1.8.24">
<PARAM NAME="CODEBASE" VALUE="http://dbmsopa5/Forms60java/">
<PARAM NAME="imageBase" VALUE="codeBase">
<PARAM NAME="CODE" VALUE="oracle.forms.engine.Main">
<PARAM NAME="ARCHIVE"
VALUE="pharmaewt.jar,f60all_jinit.jar,opaicons.jar,opaspell.jar,opa_client.jar,oclicons.jar,pharmaocjle.jar
,pharmaocgle.jar,xmlcomp.jar,xmlparserv2.jar,jle2-0-3.jar,tmsicons.jar">
<PARAM NAME="serverPort" VALUE="9000">
<PARAM NAME="serverHost" VALUE="DBMSOPA5.dbms.com">
<PARAM NAME="serverURL"
VALUE="http://dbmsopa5/servlet/opaservlet?ifcfs=http://dbmsopa5/servlet/f60servlet?config=opa45&HTMLbeforeF
orm=<b>Please%20do%20not%20close%20this%20window%20withn%20an%20oracle%20Pharmaceutical%20Applications%20ses
sion%20running.%20%20Closing%20the%20window%20will%20cause%20report/file%20viewing%20and%20help%20to%20stop
%20working.</b>&acceptLanguage=en-us">
<PARAM NAME="heartBeat" VALUE="7">
<PARAM NAME="connectMode" VALUE="Socket">
<PARAM NAME="serverArgs" VALUE="module=opamenu.fmx term=c:\opapps45\opa\opa45_fmrcpweb.res de_gridwidth=7
de_gridheight=18 userid= PSUBMAP=UNC RSMAP=UNC ">
<PARAM NAME="serverApp" VALUE="opa45">
<PARAM NAME="separateFrame" VALUE="True">
<PARAM NAME="splashscreen" VALUE="no">
<PARAM NAME="background" VALUE="no">
<PARAM NAME="lookAndFeel" VALUE="oracle">
<PARAM NAME="colorScheme" VALUE="blue">
<PARAM NAME="java_showprogress" VALUE="true">
<PARAM NAME="java_appletname" VALUE="Oracle Pharmaceutical Applications">
<PARAM NAME="java_progressimage" VALUE="http://DBMSOPA5.dbms.com/opa45/opa45logo02.gif">
<COMMENT>
</COMMENT>
</OBJECT>
<!-- Forms applet definition (end) -->

</BODY>
</HTML>

```

The previous embedded object section is removed since it is not required for IE, only for Netscape



Uses of a Static HTML file

- Once this file is available, changes which would normally affect all users for testing and debugging in the production environment that require changes to formsweb.cfg/opa45_basejini.htm can be isolated to one user by having this user run this file locally on their PC
- Examples:
 - Enabling record=collect to trace a form which crashes
 - Enabling networkRetries=100 if there is a specific user who is disconnected more frequently than other users
 - Modification of de_gridwidth/de_gridheight to see the effect on an existing layout

Isolating registry changes to individual users

- The formsweb.cfg allows calls to a separate environment for each application.
- This environment file can contain any environment variable which would normally be set in the Windows registry, usually under HKEY_LOCAL_MACHINE => SOFTWARE => ORACLE
- By creating a separate "hidden" application block in the formsweb.cfg file, an administrative URL can be created which can dynamically set registry key variables
- Note that the envFile parameter must be added to the ops45_basejinit.htm if it does not exist

```
! OC & TMS section
opa45debug]
baseHTMLJInitiator=c:\opapps45\html\opa45_basejini.htm
baseHTMLie=baseie.htm
workingDirectory=
envFile=opa45debug.env
serverURL=/servlet/opservlet
serverApp=opa45
archive_jini=pharmaewt.jar,f60all_jinit.jar,opaicons.jar,opaspell.jar,opa_client.jar,oclicons.jar,ph
form=opamenu.fmx term=c:\opapps45\opa\opa45_fmrpcweb.res de_gridwidth=7 de_gridheight=18
otherparams=
width=1000
height=1000
pageTitle=Oracle Pharmaceutical Applications
```

Isolating registry changes to individual users

- Once the OracleiSuitesHTTPService is stopped and restarted during the next downtime, there will now be a permanent debugging "hook" when calling OC/TMS.
- The url: `http://<Middle_Tier>/servlet/f60servlet?config=opa45debug`
- will now call a separate `opa45debug.env` file, which will contain the environment variable setting instead of requiring a Registry key change
- This one-time activity enables any registry key change to be tested by calling this URL separately, without restarting any services and without impacting any other users on the production system!

```
opa45debug.env - Notepad
File Edit Format View Help
# 1282005_44043PM : Configuration for OPA 4.5.0 products
#
# This file is used by the Listener servlet when starting up
# Forms runtime processes.
# The settings in this file override any settings in the
# environment in which the servlet engine (OC4J or Jserv) was started,
# any settings in the jserv.properties file (wrapper.env directives) if
# using Jserv, and any Oracle variable settings in the windows registry.
# If a variable is not set here, but is set in the registry, the registry
# value will be used.
#
NLS_LANG=AMERICAN_AMERICA.WE8ISO8859P1
NLS_DATE_FORMAT=DD-MON-RRRR
OPA_DCAPI_PDF_DEBUG=Y
```



Other Uses of Isolating Registry Changes to Specific Users

- This method is extremely powerful when used to control the FORMS60_PATH environment variable
- A separate directory can be made for forms which need to be protected from most users except administrative users. The form can be moved into this separate directory, and only the FORMS60_PATH in the debug .env file would contain this directory.
- The result is that these forms are hidden from all users except those user who know the URL to access the debugging or administrative .env file.
- Some examples of forms which administrators would like to hide but can not through the build-in menu role mappings are:
 - The Scheduled Job submission form (since a scheduled job fails once the submitting user changes their password)
 - The OS Password change form (especially on Windows RDBMS servers, where this account is a local Windows account to the RDBMS server, whose password should not be known or changed by the user)
 - The Reports Queue Manager viewing form (since this opens a webpage where any user can inadvertently kill/remove a scheduled job)



RDC 4.5.2 On-Site Individual URL Debugging

- Oracle has also seen a need to have individual session debugging for RDC 4.5.2 On-Site.
- Using variables in the calling URL, the following types of debug should be possible:
 - `http://<Middle_Tier.Domain>/opardc/rdcLogin.do?event=doSetup&debug=<options>`

where <options> are:

- all (all of the options below)
- `dcapi` (Debug DCAPI, similar to `OPA_DCAPI_PDF_DEBUG` registry key = Y)
- `plugin` (Debug RDC PDF Plugin, similar to setting the Debug in the Acrobat Reader => Oracle Clinical menu)
- `surround` (Debug the Servlet, similar to setting the debug in the `web.xml` file)



Current Limitations

- Currently, I am not aware of a way to control individual session changes to the server web.xml from a static html file
- These changes currently impact all users connected to the middle tier being changed and also requires OPA OC4J Service to be restarted.



Conclusions

- When advised to change a registry key or a setting in formsweb.cfg or opa45_basejini.htm in production environment, the methods presented here can be considered instead.
- New methods of performing this same type of isolated debugging will be available when the technology stack of OLS upgrades to include Forms 9i, which also has some URL-based debugging options.



Question and Answers

All follow-up questions, please contact:

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