DESCARTES™

Descartes® Route Planner™

Tracing and Logging Locations Guide

Version 1.19
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This document contains general guidelines. Due to customer specific configurations, some of the recommendation might change. Contact a Descartes' consultant if in doubt.

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1   Tracing and Login

1.1   UI Trace

Descartes® Route Planner™ allows for UI tracing to be configured. There are two configuration levels: Enabled and Always. Enabled turns this on for "on-demand" tracing, each user can turn it on/off as required, this however does not log every activity, many dashboard operations are not logged through this option. Always forces this on for all requests and thus should be used sparingly as it can generate an enormous amount of data.

Trace files are written to c:\inetpub\wwwroot\[application]\GeneratedFiles\TraceLog by default, the application creates a folder per day and typically maintains three to seven days of traces.

1.1.1   Enable Tracing
1.   Open UI (http://[server]/lnosfwui).
2.   Login as local/configurationmanager/changeme
3.   Under Trace level set to "True", this allows for on-demand tracing (per session).

     NOTE: Not every command is traced when using on-demand, "Always" can be enabled in these circumstances however it can be difficult to isolate the desired trace when used. Always mode should be disabled as soon as possible to avoid excessive logging.

4.   Click **Save**.
5.   Logout.

1.1.2   Generate Trace File with On-demand Tracing
1.   Go to page *before* the error would normally occur.
2.   Click the trace icon (little disk icon near the logout button, on the login page it is in the bottom left of the login box).
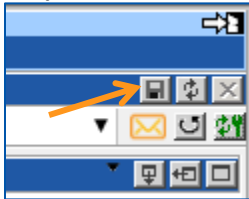
3.   Perform the action.
4.   Click the trace icon again to turn off tracing (this avoids excessive logging).

     NOTE: If [[DCF Command Tracing]] or [[DCF SQL Tracing]] is enabled in the registry this information will be captured with the UI Trace.

1.1.3   View Trace
1.   Open UI (http://[server]/lnosfwui) for the application.

     NOTE: if SSO environment must put in the appropriate application uri (e.g. /lnosfwui, /rps, /tm, etc).

2.   Login as local/configurationmanager/changeme.
3.   Go to the **Trace Log** tab.
4.   Open the appropriate trace file, each file is named based on "from" page, command and "to" page
5.   these trace files are saved on the local server at **[drive]:\inetpub\wwwroot\lnos fw ui\GeneratedFiles\TraceLog**
6.   Refer to Common Descartes Route Planner UI Trace Failures for details on common errors encountered.

1.1.4   500 Error When Trying to View Trace Log

If the below error appears when trying to view a trace log, right click the log you are trying to view and select **View Trace as XML.**

Server Error

500 - Internal server error.

There is a problem with the resource you are looking for, and it cannot be displayed.
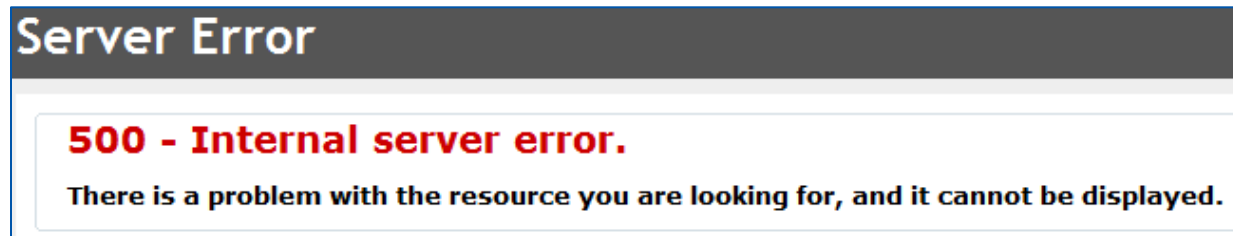
1.2   Listener Tracing

When posting XMLs to a listener sometimes it returns an incomplete or non-meaningful error messages. To further troubleshoot these requires modification of the XML and/or SQL access.

XML Modification to obtain Command XML (ReturnCommandXMLOnly=true):
In order to get the "real" XML executed by the backend *the input XML requires modification*. The attribute ReturnCommandXMLOnly="true" should be added to the first *child* of the **Request** node.

NOTE: The DocBOL is an exception where the attribute is added to the first DocBOL node and not the DocMasterBOL.

e.g.

```
<DocFWImport>
  <Header CompanyName="name" LoginName="sdf" Password="sdfsdvcx32" EchoData="true"
extDocControlID="540002808" senderID="PROD" ReceiverID="TOE" SendDateTime="04/30/2014
11:45:28 AM"/>
   <Request>
     <DocMasterBOL>
 <DocBOL ApplyFWOnly="true" AdviseType="0" MessagePurpose="1007"
             ScheduleKey="B54_Planning" ProcessCode="20" BOLNumber="540002808"
             TaskName="UpdateRouteAsync" Retry="3"
             ReturnCommandXMLOnly="true">
 </DocBOL>
     </DocMasterBOL>
   </Request>
</DocFWImport>
```

The modified XML then needs to be reposted to the listener (e.g. using the HTTP Post Test utility).
Once posted the command XML will be written to c:\inetpub\wwwroot\STAD\GeneratedFiles\PublishedFiles and usually has a filename similar to the listener. Using the filename and time stamp will allow you to identify the appropriate XML. Deleting everything before posting is another means.

This XML can then be posted to the core listener to get the full details of the problem (http://[server]/STAD/Core/CtyXMLInterface/DCFListener.asp using the HTTP Post Test utility).

1.3   DCF/cXML SQL Tracing

The LNOS DCF Data tier provides the ability to enable in-application Command Tracing. This records the methods that are called by the component. This setting is cached so the COM+ object has to be shutdown after configuring to turn it on. No files are created, however, any command XML executed will include a new set of <CmdTraceItem> elements in the response for each method executed.

1.3.1   To Enable SQL Tracing

1. Remote desktop to (each) server.
2. Open regedit.
3. Navigate to HKLM\Software\Descartes\DCF\...
4. Open CommandTraceLevel subkey
5. Change value to "3".

NOTE: On 64-bit machines the key is different: HKLM\Software**Wow6432Node**\Descartes\DCF...

1.3.2   To Disable SQL Tracing

1. Remote desktop to (each) server.
2. Open regedit.
3. Navigate to HKLM\Software\Descartes\DCF\...
   NOTE: on 64-bit machines the key is different: HKLM\Software**Wow6432Node**\Descartes\DCF...
4. Open CommandTraceLevel subkey.
5. Change value to "0".

1.3.3   Refresh Setting from Cache

1. Open **Administrative Tools > Component Services**.
2. Drill into My Computer>COM+ Applications.
3. Right click DCF and choose **Shutdown** or **Recycle**.

1.4   SQL Profiler Trace

SQL Server Profiler Trace is captured in the database directly using the 'SQL Server Profiler' tool. Work with a DBA to get the SQL Profiler Trace to be generated. The profiler trace template file below can be used. Generally it is recommended to filter to a single server which can be isolated or to a group of servers if it cannot be easily isolated.

While the SQL Profiler Trace is executed, other activities in the database should be limited.

When collecting a trace the following events are recommended:

- TSQL:BatchCompleted
- RPC:Completed
- Errors: User Errors
- Deadlock: Deadlock Graph
- Deadlock: Deadlock Chain

Once the trace is generated, DBAs can export the trace to a trace file. The size of this trace file will be large. Zip the trace file and upload to the customer support portal.

For general performance investigations a filter of **> 1 second** is recommended. Very few Descartes Route Planner queries take more than one second to execute. A query consistently taking longer may require investigation.

1.5   SQL Message Log

Every failure should be recorded to the security log but can be lacking in details. You can view this log through SQL only with the following query:

```
select ml.MsgLogID, ml.ReferenceKey,ml.MessageID,ml.Occured,ml.CommandNo, ml.ModifyDate,
mlp.ParmKey, mlp.ParmKey,mlp.ParmValue
from CtyMsgLog ml
left join CtyMsgLogParm mlp on ml.MsgLogID = mlp.MsgLogID
where ml.CommandNo='CMD441FBB849BB64C8FA5AA6D3C299C0C19'
```

NOTE: The CommandNo is retrieved from the response XML; some listeners utilize multiple commands to achieve the goal of the listener. These cannot be troubleshooted in this manner as the commandno returned may not always be the one that failed.

NOTE: The first five characters of the reference Key are the last five characters of the server name that performed the command.

Additional details for engineering can be retrieved from the trace table once you have the msglogid from the previous query:

```
select *
from CtyMsgTrace mt
left join CtyMsgTraceData mtd on mt.MsgTraceID=mtd.MsgTraceID
where mt.MsgLogID=87073
```

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1.5.1   Example Message Failure Log

Msg LogID	ReferenceKey	Message ID	Occured	CommandNo	ParmKey	ParmValue
87073	BIF02 20130916 05030661	1020	03:06.0	CMD441FBB849B B64C8FA5AA6D3 C299C0C19	@code	-2147467259
87073	BIF02 20130916 05030661	1020	03:06.0	CMD441FBB849B B64C8FA5AA6D3 C299C0C19	@description	Transaction (Process ID 659) was deadlocked on lock resources with another process and has been chosen as the deadlock victim. Rerun the transaction.
87073	BIF02 20130916 05030661	1020	03:06.0	CMD441FBB849B B64C8FA5AA6D3 C299C0C19	@description	Transaction (Process ID 659) was deadlocked on lock resources with another process and has been chosen as the deadlock victim. Rerun the transaction.
87073	BIF02 20130916 05030661	1020	03:06.0	CMD441FBB849B B64C8FA5AA6D3 C299C0C19	@source	Microsoft® OLE DB Provider for SQL Server
87073	BIF02 20130916 05030661	1020	03:06.0	CMD441FBB849B B64C8FA5AA6D3 C299C0C19	@code	-2147467259
87073	BIF02 20130916 05030661	1020	03:06.0	CMD441FBB849B B64C8FA5AA6D3 C299C0C19	@description	Transaction (Process ID 659) was deadlocked on lock resources with another process and has been chosen as the deadlock victim. Rerun the transaction.
87073	BIF02 20130916 05030661	1020	03:06.0	CMD441FBB849B B64C8FA5AA6D3 C299C0C19	@description	Transaction (Process ID 659) was deadlocked on lock resources with another process and has been chosen as the deadlock victim. Rerun the transaction.
87073	BIF02 20130916 05030661	1020	03:06.0	CMD441FBB849B B64C8FA5AA6D3 C299C0C19	@source	Microsoft® OLE DB Provider for SQL Server

1.5.2 Example Message Trace Log

MsgTraceID	MsgLogID	TraceFlags	NearClass	TopClass	TopClassFile	Method	MethodFile	MethodLine	BookmarkLine	Notes	ModifiedBy	ModifyDate
534823	87073	3	c:\lnos\dcf\core\ctydal\CtyDALImpl.h	CCtyDALImpl	c:\lnos\dcf\core\ctydal\CtyDALImpl.h	RunCmdReturnRS	.\CtyDALImpl.cpp	548	591	SELECT FWOptTask.OptTaskID, FWOptTask.RouteID, FWOptTask.OrderID, FWOptTask.OrderKey, FWRoute.ScheduleID, FWOptTask.DeleteFlag FROM FWOptTask With(UPDLOCK, ROWLOCK) INNER JOIN FWRoute	11	03:06.0
534824	87073	3	c:\lnos\fleetwise\components\lnosfwreservations\da	CFWOptTaskDS	c:\lnos\fleetwise\components\lnosfwreservations\data\lnosfwreservationsdsl\FWOptTaskDS.h	getRoute	.\FWOptTaskDS.cpp	247	283	11	11	03:06.0
534825	87073	3	c:\lnos\dcf\core\ctycommandul\CtyCmdExecBase.h	CLNOSFWReservationsDCX	c:\lnos\fleetwise\components\lnosfwreservations\data\lnosfwreservationsdcl\L	executeCommand	.\CtyCmdExecBase.cpp	423	475	11	11	03:06.0

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MsgTraceID	MsgLogID	TraceFlags	NearClass	TopClass	TopClassFile	Method	MethodFile	MethodLine	BookmarkLine	Notes	ModifiedBy	ModifyDate
					NOSFWReservationsDCX.h							
534826	87073	3	c:\lnos\dcf\core\ctycommandul\CtyCmdExecBase.h	CLNOSFWReservationsDCX	c:\lnos\fleetwise\components\lnosfwreservations\data\lnosfwreservationsdcl\LNOSFWReservationsDCX.h	executeCommand	.\CtyCmdExecBase.cpp	313	382	11	11	03:06.0
534827	87073	3	c:\lnos\dcf\core\ctycommandul\CtyCommand.h	CFWOptTaskDSCmd	c:\lnos\fleetwise\components\lnosfwreservations\data\lnosfwreservationsdil\LNOSFWReservationsDSCmd.h	execute	.\CtyCommand.cpp	369	497	11	11	03:06.0
534828	87073	3	c:\lnos\dcf\core\ctycommandul\CtyCommand.h	CFWOptTaskDSCmd	c:\lnos\fleetwise\components\lnosfwreservations\data\lnosfwreservationsdil\LNOSFWReservationsDSCmd.h	execute	.\CtyCommand.cpp	369	514	11	11	03:06.0
534829	87073	3	c:\lnos\fleetwise\components\lnosfwreservations\bu	CDocOrderTaskBS	c:\lnos\fleetwise\components\lnosfwreserva	runOptTask	.\DocOrderTaskBS.cpp	1497	1712	11	11	03:06.0

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MsgTraceID	MsgLogID	TraceFlags	NearClass	TopClass	TopClassFile	Method	MethodFile	MethodLine	BookmarkLine	Notes	ModifiedBy	ModifyDate
					tions\business\lnosfwreservationsbsl\DocOrderTaskBS.h							
534830	87073	3	c:\lnos\dcf\core\ctycommandul\CtyCmdExecBase.h	CLNOSFWReservationsBC	c:\lnos\fleetwise\components\lnosfwreservations\business\lnosfwreservationsbcl\LNOSFWReservationsBC.h	executeCommand	.\CtyCmdExecBase.cpp	423	475	11	11	03:06.0
534831	87073	3	c:\lnos\dcf\core\ctycommandul\CtyCmdExecBase.h	CLNOSFWReservationsBC	c:\lnos\fleetwise\components\lnosfwreservations\business\lnosfwreservationsbcl\LNOSFWReservationsBC.h	executeCommand	.\CtyCmdExecBase.cpp	313	382	11	11	03:06.0
534832	87073	3	c:\lnos\dcf\core\ctycommandul\CtyCommand.h	CDocOrderTaskBSCmd	c:\lnos\fleetwise\components\lnosfwreservations\business\lnosfwreservationsbil\LNOSFWReservationsBSCmd.h	execute	.\CtyCommand.cpp	369	497	11	11	03:06.0

1.6　DCF/cXML API SQL/Command Trace

The SQL calls executed during an API call can be traced by enabling SQL trace in the registry on the application server.

Regedit → HKLM → Software → Descartes → DCF → **SQLTraceLevel** → (Default)

NOTE: on 64-bit machines the key is different: HKLM\Software**Wow6432Node**\Descartes\DCF...

Set a non-zero value for (Default), typically "3".

The **CommandTraceLevel** can be similarly configured, this capture which functions were executed and can aid in debugging application failures.

NOTE: To disable debugging, set the value back to "0".
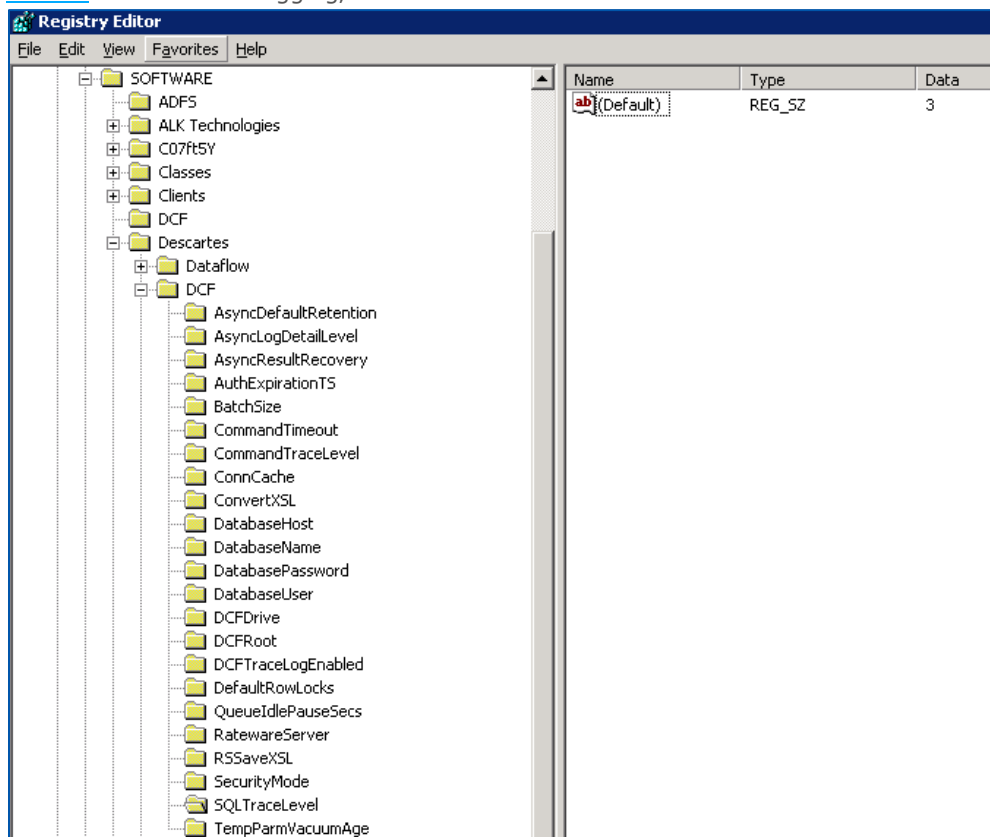
Shut down the DCF COM+ Component for the setting to take effect.
- Open **Administrative Tools > Component Services**.
- Drill into **My Computer > COM+ Applications**.
- Right click DCF and choose **Shutdown** or **Recycle**.

The response XML for API calls (cXML, UI trace, BGO XML) will have the SQL and/or command Trace.

Example,

```xml
<?xml version="1.0"?>
<Command>
  <Header>
    <Authentication>
      <CompanyName>Acme</CompanyName>
      <GroupName/>
      <LoginName>importer</LoginName>
      <Password>**********</Password>
      <Impersonate><DomainName/><GroupName/><LoginName/></Impersonate>
    </Authentication>
    <SystemData>tPFdV6HuQ...M/W1WZsX</SystemData>
  </Header>
  <Execute>
    <Function>
      <ApplicationCode>RST</ApplicationCode>
      <MenuName>TMO</MenuName>
      <ModuleName>Shipment</ModuleName>
      <FunctionName>Import</FunctionName>
    </Function>
    <Parms>
      <Input Echo="Y">
        <parmDocShipment>
          <DocShipment OverridenContainerType="1" OverridenContainerQty="0.1" TotalSellingPrice="32.10"
TotalDeclaredValue="32.10" PreSelCarrierCode="" LatestAvailDate="2012-03-21T00:00:00" BillingOption="20"
AcntShipmentNo="0837811721" AcntRefNo1="DEP1">
            <CtyShpAddressOrg CompanyName="Acme Depot 1" LocationNo="DEP1"/>
            <CtyShpAddressDst CompanyName="McDonalds" LocationNo="0001253096" Country="US"
PostalCode="10019" State="NY" City="NEW YORK" StreetName="123 Main ST"/>
            <DocShpLineItem AcntRefNo1="BPARTIAL PACKAGE,LINES:10" WgtUOM="200" VolUOM="3"
TotalVolume="1" TotalLineItemWeight="6.4" SKUNumber="NON25444" OrderQty="2000" Harzardous="0"
DimUOM="420" Description="all beef paties" ContainerType="16" ContainerQuantity="1" ContainerLength="20"
ContainerWidth="9.375" ContainerHeight="9.375" AcntLineItemNo="000010-001"/>
            <!-- DocShpAccessorial> <CtyAccessorial AccCode="LIFT" /> </DocShpAccessorial> <DocShpAccessorial>
<CtyAccessorial AccCode="IND" /> </DocShpAccessorial-->
          </DocShipment>
        </parmDocShipment>
      </Input>
      <Output>
        <parmShipmentID>36780</parmShipmentID>
      </Output>
    </Parms>
    <Status>
      <Result>SUCCESS</Result>
      <Count>0</Count>
      <ResultTime>12-03-21 10:11:52 CDT</ResultTime>
      <CommandNo>CMDFC4B393F12894B019ACCFAA46C6F3D59</CommandNo>
      <AuthServer>demodbca01:TMAcme</AuthServer>
      <DataServer>demodbca01:DCFTST</DataServer>
      <ElapsedTime>27579</ElapsedTime>
```

```
<SqlTrace>
  ...
  <SqlTraceItem>
    <TimeStamp>03/21/12 10:11:52</TimeStamp>
    <ThreadID>636</ThreadID>
    <CommandClass>CCtySecureDSCmd</CommandClass>

<Connection>SERVER=demodbca01;DATABASE=TmAcme;UID=LNOSSystem;PWD=******;;PROVIDER=MSDataShape;DATA PROVIDER=SQLOLEDB.1;;Application Name=TmAcme</Connection>
    <ElapsedTime>0</ElapsedTime>
    <SQL>Insert Into DCFSecCtyShipment (RightID,DocumentID,DocUserID,AccessMethod)
Values(25,36780,0,1);Insert Into DCFSecCtyShipment (RightID,DocumentID,DocUserID,AccessMethod)
Values(109,36780,0,1);</SQL>
  </SqlTraceItem>
  ...
  <SqlTraceItem>
    <TimeStamp>03/21/12 10:11:24</TimeStamp>
    <ThreadID>636</ThreadID>
    <CommandClass>CCtyLoginDSCmd</CommandClass>

<Connection>SERVER=demodbca01;DATABASE=TmAcme;UID=LNOSSystem;PWD=******;PROVIDER=MSDataShape;DATA PROVIDER=SQLOLEDB.1;;Application Name=TmAcme</Connection>
    <ElapsedTime>16</ElapsedTime>
    <SQL>SELECT * FROM CtyLogin WHERE DomainName = N'Acme' AND LoginName = N'importer'</SQL>
  </SqlTraceItem>
  <SqlTraceItem>
    <TimeStamp>03/21/12 10:11:24</TimeStamp>
    <ThreadID>636</ThreadID>
    <CommandClass>CDCFHostDSCmd</CommandClass>
    <Connection>SERVER=demodbca01;DATABASE=DCFTST;UID=LNOSSystem;PWD=******;</Connection>
    <ElapsedTime>0</ElapsedTime>
    <SQL>SELECT DH.DomainName, H.* From DCFDomainHost DH Inner Join DCFHost H On
DH.HostID=H.HostID Where ((DH.ApplicationName=N'RST') Or (DH.ApplicationName is NULL)) And
((DH.DomainName=N'Acme') Or (DH.DomainName is NULL)) Order By DH.DomainName desc, DH.ApplicationName
desc</SQL>
  </SqlTraceItem>
  </SqlTrace>
  </Status>
  </Execute>
</Command>
```

NOTE: The most recent query will be the topmost SqlTraceItem and the first query will be the last SqlTraceItem.

2 Troubleshooting DCF Services Not Running

DCF Services could fail to start (or hang during start) for several reasons, the most common once are:

- Service account does not have appropriate permission
- Service will not start
- Must be configured as local admin
- Must be configure with run as a service right

Re-type in the password in the "logon" section of the service properties will automatically grant this right. Grant through local security policy manager. SQL is unreachable will result in service getting stuck in a Starting state. Error will be logged to LNOS DCF event log.

Service fails to start with "Error 1058: the service cannot be started either because it is disabled or because it has no enabled devices associated with it." This error normally occurs immediately on service start.

This can be resolved by:

- Go to the **service properties**
- Change the **startup mode** to **Disabled**, click **OK**
- Change the **startup mode** to **Automatic** (or manual), click **OK**
- Attempt to **start** the service.

2.1 Did Not Start on Boot

In order for the DCF$ service to start on boot, several dependencies need to be available, some are external and cannot be enforced but some are local to the server so can be enforced (and usually are by the installer).

DCF$ service dependencies include:

- **SQL Server -** The DCF service needs to connect to the SQL server to work. If it is unavailable, the service may be stuck in a Starting state. If this occurs the only option is to kill the service using Task Manager. See Determining process ID for Service for how to determine which process to kill.
- **MSMQ -** This service must be running, the service normally has a dependency setup - see service properties > dependencies. T
- The specific queue should either not exist (service will create) or the queue must have full control for the service account. See Fixing MSMQ queue permissions for how to resolve this issue.

Some less obvious dependencies are:

- **Network Stack -** as the DCF service needs to connect to SQL it cannot do this if networking is not available. A dependency for this is not yet known.
- **Server Service -** in order to perform server operations this service must be running
- **Client Service -** needed to create connections to external servers

See Descartes Route Planner Supported Interfaces for a listing of which services are tied to which interfaces.

2.2   Determining process ID for Service

```
Get-WmiObject -cn server1,server2,etc -Class win32_service | where({$_.DisplayName -match
"^(LNOS|DCF|NS)[$]|^FW([_](Optimizer|Scheduler)|BatchProcessor)"}) | select
PSComputerName,DisplayName,StartMode,State | sort PSComputerName,StartMode, State
```

See commandline tasks FAQ for full details.

3   Troubleshoot SQL Connection Problems

Descartes Route planner is heavily dependent on the SQL server and troubleshooting a connection issue can be difficult. The following guide provides instructions on how to troubleshoot this issue.

In order to troubleshoot it is important to first understand how the connections are managed.

UI session management (for load balanced UI servers) comes directly from IIS and is defined through local/configurationmanager/changeme or through \wwwroot\[LNOS APP]\GeneratedFiles\Config.xml (in this case LNOS APP is LNOS FW UI).

Application Data Connections (COM+) The application connections go through the COM+ Application as it is the "Data Tier". The application first connects to the DCF "Core" database. It reads the following registry key: HKLM\Software\Descartes\DCF\...

NOTE: on 64-bit machines the key is different: HKLM\Software**Wow6432Node**\Descartes\DCF...

There are several subkeys:

- DatabaseHost
- DatabasePassword (this is encrypted)
- DatabaseUser
- DatabaseName (this is the DCF "Core" database).

It then connects to the DCF database to determine the database and SQL server for each application database, this information is contained in the DCFHost table and DCFDomainHost view (summarizing DCFConnection, DCFOrgApp, DCFOrg tables). It then establishes the connection to the "Application" database (in this case Descartes Route Planner or Security).

If the UI Session information is incorrect the login page will display a white page with a SQL connection error. This issue can only be resolved by editing the appropriate GeneratedFiles\Config.xml file.

If the application cannot connect to DCF or the Application databases, it requires investigating the registry keys listed above and the DCF database tables/views.

The following query is very helpful in diagnosing this:

```
use dcf
select dh.*,
    h.DatabaseName,h.ServerName, h.DefaultDomain, h.DefaultUserName, h.DefaultPassword
from dcfhost h
join dcfdomainhost dh on h.hostid=dh.HostID
```

Here are some means to test:
- Ping the SQL host defined in the registry/host tables
- Use administrative tools > ODBC to create connection to the DCF database using the registry details
- Use ODBC to create connection to the DCF database using the domain/host table details
- Use ODBC to create connection to each "org" db using using the domain/host table details

4   HTTP Post Test Utility

Descartes Route Planner includes a utility to test business documents. This utility can be found at http://[server]/STAD/Core/AdminTools

NOTE: You may be prompted for credentials. Any server/domain account will work
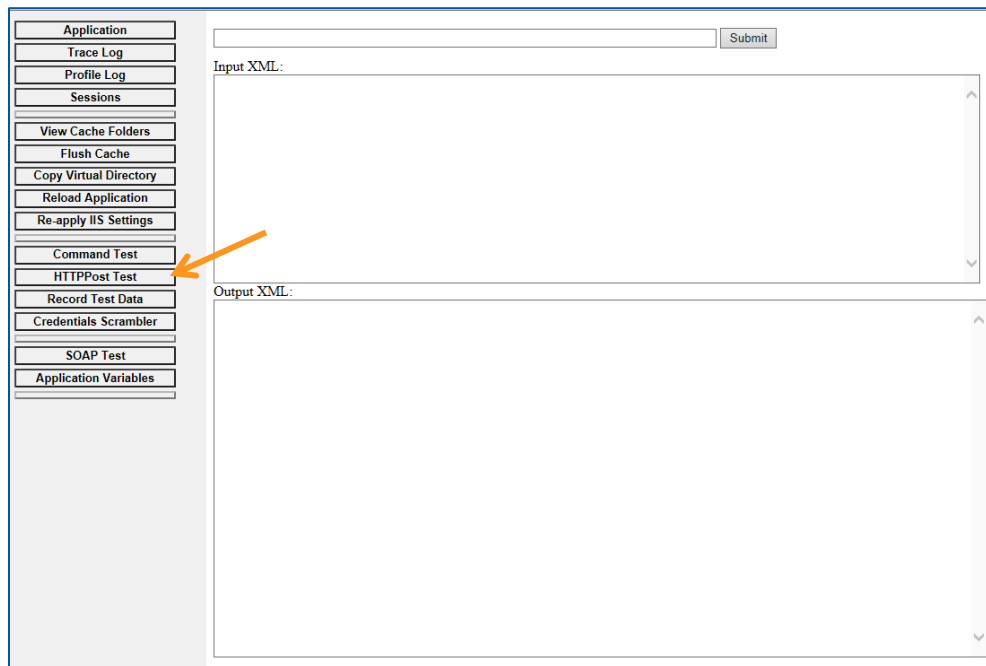
Click the **HTTP Post Test** button.

You will be presented with three text boxes:
- First box: URL
- Second box: Input XML
- Third box: Response XML

To use the utility:
1   Type/paste the URL in the first box. If hosted, make sure you use the INTERNAL server URL.
2   Type/paste the input XML to test in the second box.
3   Click **Submit**.
4   Review response in the 3rd box.

NOTE: This utility does NOT support SSL URLs.

NOTE: The input XML is wiped out after submission. Click the browser back button to load it again. Alternatively, copy the input XML before clicking **Submit**.

5   Login Problems

5.1   Login Page Loading Times Out

When the login page times out, it could be a client, network, cluster or server issue. This page helps isolate the potential problem.

- Determine the URL used and attempt to load the page from a different "client" (either your computer or another user at the customer site, depending on accessibility).
- If the page loads there are three possibilities (check in order)
- The problem is affecting a single node (if it is a cluster)
- Open a browser to the login page replacing the public/cluster name with the host name of each "node" in the cluster.
- Verify login page is reachable on all nodes.
- If page does not load on one or more servers, note which servers are failing.
- See Resolve Server Not Responding Issue.
- The client computer is unable to reach the cluster. This is usually caused by a client firewall or network problem.

Try the following activities (from the client):

Lookup the address:
1. Open a command prompt.
2. Type "nslookup [hostname]".
3. If no IP address is returned, this is a DNS issue. Escalate to client desktop/network teams.
4. Ping the host.
5. Open a command prompt.
6. Type "ping [hostname]".
7. You should see successful responses if network is functioning.
8. This is not a guarantee as some firewalls deny this type of traffic. If possible, verify this at a time when the system is working.
9. If the ping fails, try a tracert.
10. Open a command prompt.
11. Type "tracert [hostname]".

You may see some failures; this is ok. If you see three or more rows returning with "* * *", the system cannot find the next hop. The last successful hop is the indicator the problem and you will need help from the customer/network team to identify "who" owns that hop and if it is a problem or not.

If you see it bouncing between two addresses, this is a network routing issue. If it is a public address, there is nothing that can be done. If it is a customer or Descartes address, it needs to be escalated to the appropriate network team.

If all the tests above succeed, try a telnet (may not be possible depending on client configuration).

1. Open a command prompt.
2. Type "telnet [hostname] 80" or "telnet [hostname] 443" depending on if they are using http or https respectively.
3. The screens could go blank.

If a blank screen is returned, type in "get default.asp" and press **Enter**. You should get a response (failure or otherwise). If it returns to normal command prompt as soon as you type a few letters, this indicates that a connection can be created, but transmitted. This is normally a firewall issue. If it does not respond this indicates there is likely a problem in receiving the response and is also normally a firewall issue.

If it returns a failure to connect, this usually indicates a firewall issue where the ports are blocked (instead of "sinked"). User has "Remember me" enabled and there is an issue logging in instead. See Login Page Loaded Can't Login for more details.

5.2   Login Page Does Not Load

Perform subtest one from previous section. This will allow isolating which server is the problem (if it is a node problem) and follow associated resolution tasks.If no nodes fail to respond this indicates a clustering failure.

If using Microsoft® Network Load Balancing®:

1. Remote Desktop to one of the servers in the cluster
2. Open Network Load Balancing® manager from **Administrative Tools**.
3. Select **Connect to Existing**.
4. Type in localhost and select **Connect**.
5. Look at each node in cluster. Make sure there is at least one "green" node (active).
6. If using Hardware Load Balancer (LTM or F5; most of the Descartes Route Planner hosted sites and new implementations use a hardware load balancer).
7. Check with the networking team to investigate the load balancer.

Internal use. If you have access to the hosted LTM go to the LTM page:
F5 LTM is https://[serverip]/tmui/login.jsp
Login and navigate to **Local Traffic > Network Map**.
Click **Show Map**.
Each "cluster" is VIP_LNOS_[env]_[class]_[http(s)]
- red = node/cluster down
- green = node/cluster up
- black = node/cluster disabled
- blank = rule
- blue = node/cluster not monitored

5.3 Login Page Displays White Screen

The **Login** page will display a white screen if it encounters an ASP error. The two most common reasons are an incorrect SQLSessionServer configuration or incorrect permissions on the GeneratedFiles folder.

- SQLSessionServer troubleshooting
- See Troubleshoot SQL Connection Problems for more details
- GeneratedFiles permission

The generated files folder requires permissions for IIS to be able to create or remove files and folders. The instructions to resolve different depending on the Microsoft® Windows® version.

Navigate to c:\inetpub\wwwroot\[Application]\GeneratedFiles (where [Application] is LNOS FW UI).

1. Right click and select **Properties**.
2. Navigate to the **Security** tab.
3. Microsoft® Windows Server® 2003 (also Microsoft® Windows® XP).
4. Review the list of users. If any of the following are missing, they need to be added:
   - IIS_WPG
   - Internet GUest Account (IUSR_*)
   - Launch IIS Process Account (IWAM_*
5. To add users:
   1. Click **Add**...
   2. Choose Locations and select the server name.
   3. Click **Advanced**.
   4. Click **Find Now**.
   5. Double click the accounts.
   6. To configure, select the account, select **Full Control** and then repeat for each account.
   7. Click **OK**.

5.3.1 Microsoft® Windows Server® 2008 (Microsoft® Windows Vista® and Windows® 7)

- Review the list of users. If any of the following are missing, they need to be added:
  - IUSR
  - IIS_IUSRS
  - Click **Edit**.
- To add them
  1. Click **Add**...
  2. Choose Locations and select the server name.
  3. Click **Advanced**.
  4. Click **Find Now**.
  5. Double click the accounts.

  To configure:
  1. Select the Account.
  2. Check **Full Control**.
  3. Repeat for each account.

4. Click **OK**.

5.3.2 UI Unable to Connect to SQL

A less common cause is when the UI is unable to connect to SQL. In this case, no error is displayed and the page will take longer to load before displaying a white screen. This can be checked by going to the eventlog and looking at the LNOS DCF eventlog, look for errors like:

Log Name: LNOS DCF
Source: DCF
Date: 1/6/2014 2:39:43 AM
Event ID: 0
Task Category: None
Level: Warning
Keywords: Classic
User: N/A
Computer: UI01
Description:
Attempt #1 to connect to :
PROVIDER=MSDataShape;DATA
PROVIDER=SQLOLEDB.1;SERVER=SQL01\preprod;DATABASE=DCF;UID=FWSystem; failed
<DCFException></DCFException>

retrying...
A ping to the database will verify if basic connectivity is available, this will need to be investigated by the server/network team.

5.4 Login Page Server Error

When trying to load the login page, a server error may be returned. The most common error is a HTTP 500 error. Below instructions to enable IIS tracing to capture the details of when an application crashes with a 500 error or takes an excessive amount of time to finish. This should typically be configured on UI (User Interface) and BIF (Backend Interface Servers). This process does not require a server outage; however, it does require installing an IIS role service.

NOTE: The entire install can be scripted and a sample script is provided at the end of the document.

5.4.1 Install IIS Tracing
You first need to install the tracing role service.
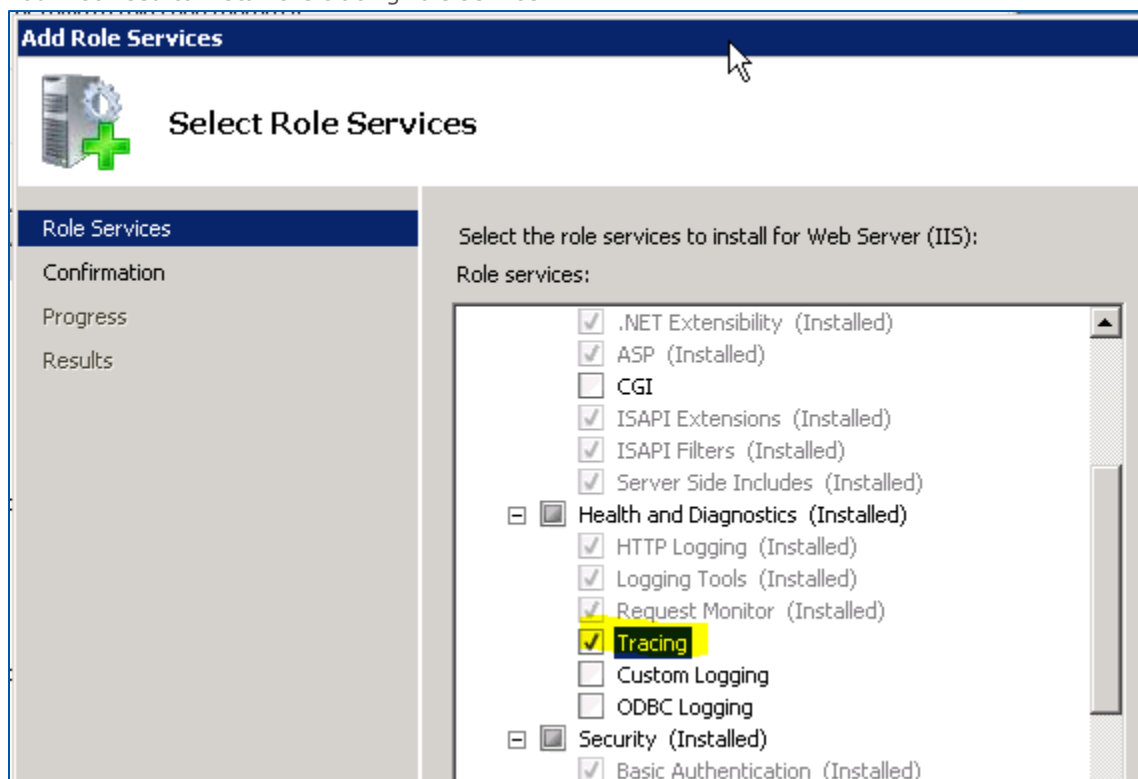
This can be done via console as well:
START /WAIT DISM /Online /Enable-Feature /FeatureName:IIS-HttpTracing

5.4.2 Configure Trace Size
The trace size should be configured to 100mb. This can only be done via the console.
CD %systemroot%\system32\inetsrv\
Appcmd.exe set config /section:sites -siteDefaults.traceFailedRequestsLogging.maxLogFileSizeKB: 102400

5.4.3 Enable Tracing and Base Configuration
Navigate to the Default Web Site. Under Configure, choose **Failed Request Tracing**.
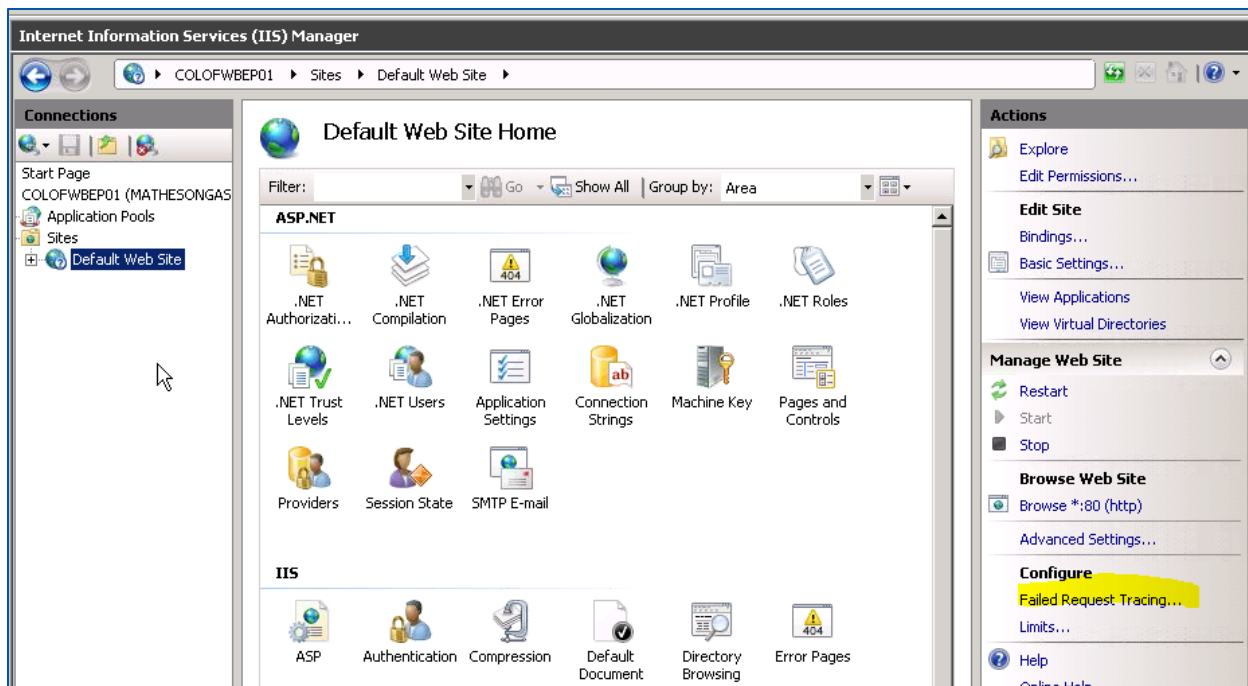
Enable tracing, configure path and maximum files to keep.
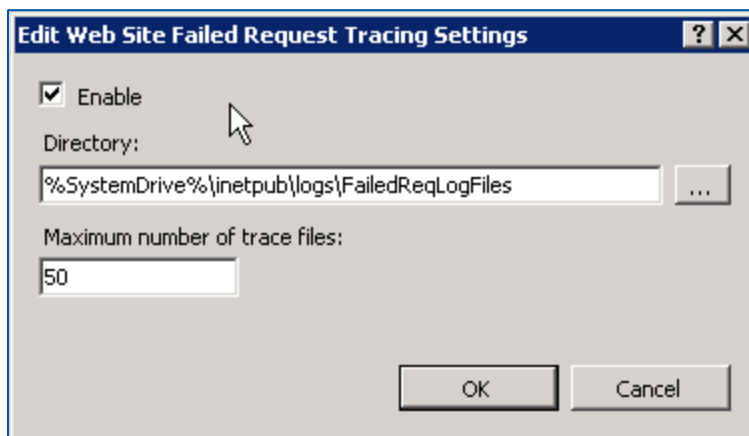
You need 100mb per file so configure the directory and the maximum number appropriately.

This can be done by the following console commands:

> CD %systemroot%\system32\inetsrv\
> appcmd.exe set config /section:sites -siteDefaults.traceFailedRequestsLogging.maxLogFileSizeKB:102400
> appcmd.exe set config /section:system.applicationHost/sites "/[name='Default Web Site'].traceFailedRequestsLogging.enabled:true" /commit:apphost
> appcmd.exe set config /section:system.applicationHost/sites "/[name='Default Web Site'].traceFailedRequestsLogging.directory:%TracePath%" /commit:apphost
> appcmd.exe set config /section:system.applicationHost/sites "/[name='Default Web Site'].traceFailedRequestsLogging.maxLogFiles:30" /commit:apphost

5.4.4 Configure Tracing Rules

Once enabled, a set of rules need to configure to determine when a trace file should be generated.
Under the Default Web Site, IIS Section choose **Failed Request Tracing Rules**.
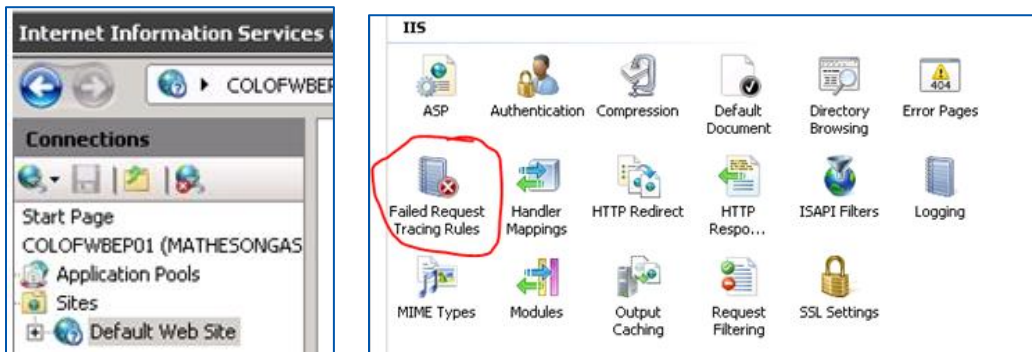
Click **Add...** to setup a new rule. Choose what you would like to trace and what conditions:
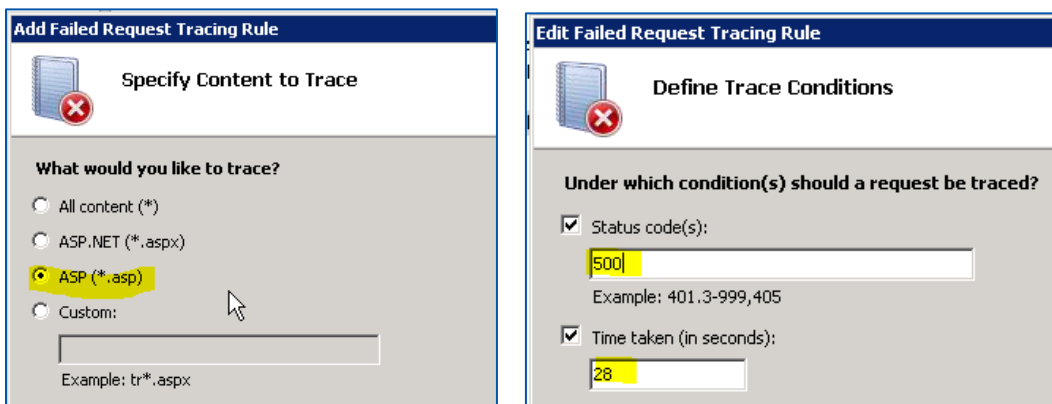
NOTE: This is an OR condition, so if either condition is met it will be marked as a failure to trace, 28 seconds is two seconds less than a typical timeout.

Select the providers:
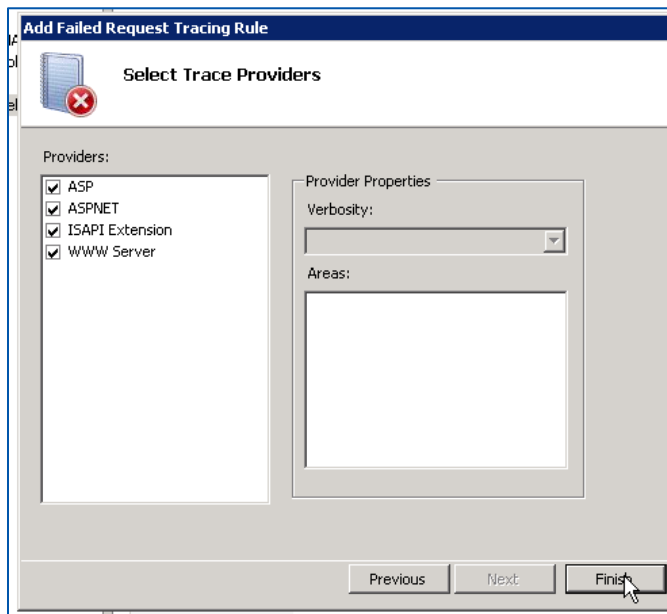
Accept the defaults and choose **Finish.**

This can be done by the following console commands:

```
CD %systemroot%\system32\inetsrv\
appcmd.exe set config "Default Web Site/" /section:system.webServer/tracing/traceFailedRequests
/+"[path='*.asp']"
appcmd.exe set config "Default Web Site/" /section:system.webServer/tracing/traceFailedRequests
/+"[path='*.asp'].traceAreas.[provider='ASP',areas='',verbosity='Verbose']"
appcmd.exe set config "Default Web Site/" /section:system.webServer/tracing/traceFailedRequests
/+"[path='*.asp'].traceAreas.[provider='ASPNET',areas='Infrastructure,Module,Page,AppServices',verbosity
='Verbose']"
appcmd.exe set config "Default Web Site/" /section:system.webServer/tracing/traceFailedRequests
/+"[path='*.asp'].traceAreas.[provider='ISAPI Extension',areas='',verbosity='Verbose']"
appcmd.exe set config "Default Web Site/" /section:system.webServer/tracing/traceFailedRequests
/+"[path='*.asp'].traceAreas.[provider='WWW
Server',areas='Authentication,Security,Filter,StaticFile,CGI,Compression,Cache,RequestNotifications,Module,
FastCGI',verbosity='Verbose']"
appcmd.exe set config "Default Web Site/" /section:system.webServer/tracing/traceFailedRequests
/"[path='*.asp'].failureDefinitions.statusCodes:"500"
appcmd.exe set config "Default Web Site/" /section:system.webServer/tracing/traceFailedRequests
/"[path='*.asp'].failureDefinitions.timeTaken:"00:00:28"
```

Sample Script
REM Enable Tracing
START /WAIT DISM /Online /Enable-Feature /FeatureName:IIS-HttpTracing

REM Prepare Trace Folder
SET TracePath=E:\Logs\FailedReqLogFiles
MD %TracePath%

REM Enable and configure tracing

```
CD %systemroot%\system32\inetsrv\
appcmd.exe set config /section:sites -siteDefaults.traceFailedRequestsLogging.maxLogFileSizeKB:102400
appcmd.exe set config /section:system.applicationHost/sites "/[name='Default Web
Site'].traceFailedRequestsLogging.enabled:true" /commit:apphost
appcmd.exe set config /section:system.applicationHost/sites "/[name='Default Web
Site'].traceFailedRequestsLogging.directory:%TracePath%" /commit:apphost
appcmd.exe set config /section:system.applicationHost/sites "/[name='Default Web
Site'].traceFailedRequestsLogging.maxLogFiles:30" /commit:apphost
appcmd.exe set config "Default Web Site/" /section:system.webServer/tracing/traceFailedRequests
/+"[path='*.asp']"
appcmd.exe set config "Default Web Site/" /section:system.webServer/tracing/traceFailedRequests
/+"[path='*.asp'].traceAreas.[provider='ASP',areas='',verbosity='Verbose']"
appcmd.exe set config "Default Web Site/" /section:system.webServer/tracing/traceFailedRequests
/+"[path='*.asp'].traceAreas.[provider='ASPNET',areas='Infrastructure,Module,Page,AppServices',verbosity
='Verbose']"
appcmd.exe set config "Default Web Site/" /section:system.webServer/tracing/traceFailedRequests
/+"[path='*.asp'].traceAreas.[provider='ISAPI Extension',areas='',verbosity='Verbose']"
appcmd.exe set config "Default Web Site/" /section:system.webServer/tracing/traceFailedRequests
/+"[path='*.asp'].traceAreas.[provider='WWW
Server',areas='Authentication,Security,Filter,StaticFile,CGI,Compression,Cache,RequestNotifications,Module,
FastCGI',verbosity='Verbose']"
appcmd.exe set config "Default Web Site/" /section:system.webServer/tracing/traceFailedRequests
/"[path='*.asp'].failureDefinitions.statusCodes:"500"
appcmd.exe set config "Default Web Site/" /section:system.webServer/tracing/traceFailedRequests
/"[path='*.asp'].failureDefinitions.timeTaken:"00:00:28"
```

More information:
http://www.iis.net/learn/application-frameworks/running-classic-asp-applications-on-iis-7-and-iis-8/using-failed-request-tracing-to-troubleshoot-classic-asp-errors
http://www.iis.net/configreference/system.webserver/tracing/tracefailedrequests/add/failuredefinitions

5.5   Login Page Loaded Cannot Login

After the login page is loaded, users can attempt to login. This process can fail if the user is not correctly configured OR if there are problems in the backend component. There is no way for an end user to identify the difference.

- First thing is to confirm if the user was previously able to login.
- If the user could login:
    - Have they changed their password or has anything been changed about their account? This is the first place to start.
    - If an installer has recently been run, even in another environment this could be a potential cause:
        - e.g. if installer is run in preprod but a database was restored from the problem environment it could be the DCF database was restored in error.
        - e.g. if installer is run in preprod but user misconfigured installer to point at production
        - In both these cases it could either upgrade the db to a point it is no longer compatible or it could alter the `DCF.dbo.DCFHost` table and put the wrong configuration entries in here.
        - A good clue of a database upgraded is the message "invalid column name"; this usually occurs because the code and the database have different definitions of the table.
    - If they could previously login and the account has not changed, this is likely a system issue, see below.
- If the user could not login:
    - Login as fw-usradmin or [company]-usradmin.
    - Ignore popup and click **Refresh**.
    - Navigate to active users and search for user.
- If the user does not appear, customer needs to activate the account:
    - Edit the user.
    - Navigate to the **User Group** tab.
    - Verify user has a default group - Make note of this group.
    - Go to the **Roles** tab.
    - Verify user has at least one role (at least LNOSFW-Readonly or a custom role that grants the login privileges, may require custoemr knowledge to answer this. Most custom roles do not grant this level of access). Make note of these roles.
- Login as fw-secadmin or [company]-secadmin.
- Navigate to **Setup > User Groups**.
- Search for the default group noted in 3.6.1, verify it is marked as active.
- Edit the noted group, verify that the roles listed on the user also exist at the group and make note of which match for those that match. Make sure at least the lnosfw-readonly or a custom role that grants the login privileges is remaining.

If neither of these is the case it is likely a system issue. To verify COM+ package is healthy:
1. Open http://[server]/[appui]/core/CtyXMLInterface/DCFListener.asp
2. Where [appui] is the same user interface the user was trying to log in to.
3. The response should be <Root>DCF HTTP Listener</Root>. If this response is not received or <Root>DCF Package Not Resolved</Root> is received, it could indicate the COM+, IIS is unhealthy or the COM+ package is not correctly set up.

As a first step using RestartCOM to restart the COM+, IIS and related services will resolve most unhealthy situations. A second step is to reboot the server in question. If still not working, it could indicate a corrupted COM+ or the application is set up incorrectly. The application may need to be re-installed. Contact Descartes for support.

1. Enable DCF SQL Tracing and Enable UI Tracing.
2. Turn on tracing.
3. Attempt to login.
4. Follow the UI tracing instructions to determine the cause.

Common issues:
- Wrong password
- Password expired
- Password does not meet complexity (is automatically deactivated), no warning to usradmin
- Unable to connect to SQL see Troubleshoot SQL Connection Problems
- COM+ unhealthy see Resolve Server Not Responding Issue

If IIS cannot instantiate COM+ this is extremely difficult to troubleshoot, in the UI trace the External Commands section will show no commands executed. Normally there is a Login.Login.Login external command. The screenshots below illustrate the difference.

Investigate and Resolve "DCF Package Not Resolved"
- Reboot server if the previous two steps did not resolve the issue.
- If user is immediately redirected to the login after dashboard starts to load this could be caused by an ASP server error (e.g. 0113 - script timeout). To get the details of this error have the user see Disable HTTP Friendly Error Messages or check the IIS log for more details.

6   User Interface Problems

6.1   Disable HTTP Friendly Error Messages

By default Microsoft® Internet Explorer® enables a feature called HTTP Friendly Error messages. While they may be friendly to the end user they make it very difficult for troubleshooting the application. In some instances it just displays a white page with a message like "Site has encountered an error, please talk to your administrator" but no further details. In other instances it redirects the user to the Login page without displaying any error. It is highly recommended that this be turned off.

To do this:
1.   Go to **Tools > Internet Options**
2.   **Advanced** tab.
3.   Browsing section.
4.   Deselect **Show Friendly HTTP Error Messages**.

This is the recommended configuration for all browsers.

6.2   Accepts Credentials but Home Page Does Not Load

After logging in, the most common reason for being unable to get the dashboard is insufficient privileges (roles).

This is can be troubleshooted using the same techniques as: Page Cannot be Found Error.

6.3   Dashboard Quadrant Does Not Display

If the dashboard does not load data there are two common causes.

The first issue is a column has been added (or modified by an upgrade) that the application cannot load (bug). This can be troubleshooted using UI Tracing and Page Cannot be Found Error, in the case of bad columns no error is currently displayed to the user (Descartes Route Planner 12.x, 11.x) but older version may (Descartes Route Planner 10.x or earlier).

The second issue is the user does not have access to the current schedule (either first login or a change in access) To verify this, after logging in, look below the **Home** menu. The current schedule should display. If this is () it is a good indication of this problem. Navigating to **Data > Schedules** allows you to verify the schedules to which the user has access. If schedules are missing, try resecuring the user's user group.

6.3.1   Descartes Route Planner 11.x Upgraded to 12.x, 13.x or Later Issue

After upgrading from an 11.x install to 12.x or later version a user is able to login, the menu is displayed but the dashboard will not load (no quadrants at all). The application displays "requesting data". After waiting 10 minutes the user will either see a script timeout error or will be redirected back to the login page (ASP 0113 script timeout will be logged in the IIS log either way). This occurs because the application is unable to communicate with the license database.

6.4   Dashboard Display but Stuck on Loading Data

When first logging the dashboard quadrants are displayed but are stuck showing "Loading Data..." Clicking the **Home** option should refresh the dashboard and load the data. If this does not help, the issue could be one of the following:

1. The browser cache on the local machine(s) needs to be cleared (usually only after an upgrade).
   - Clear the Cookies and Temporary Internet Files from within the browser options.
   - If that does not work, the cache needs further clearing from the dev tools. This can be accessed by pressing F12 in the browser and then selecting **Cache > Clear Browser Cache** for this domain.
2. The application pool is reaching the request limit too quickly (2k requests). This is causing it to flush over and over again.
   - The following commands can be used to log these recycles:
     %windir%\system32\inetsrv\appcmd set config /section:applicationPools /[name='LNOSFW'].recycling.logEventOnRecycle:PrivateMemory
     %windir%\system32\inetsrv\appcmd set config /section:applicationPools /[name='LNOSFW'].recycling.logEventOnRecycle:Memory
     %windir%\system32\inetsrv\appcmd set config /section:applicationPools /[name='LNOSFW'].recycling.logEventOnRecycle:Schedule
     %windir%\system32\inetsrv\appcmd set config /section:applicationPools /[name='LNOSFW'].recycling.logEventOnRecycle:Requests
     %windir%\system32\inetsrv\appcmd set config /section:applicationPools /[name='LNOSFW'].recycling.logEventOnRecycle:Time
   - The following command can be used to change the threshold:
     %windir%\system32\inetsrv\appcmd set apppool /apppool.name:LNOSFW /recycling.periodicRestart.requests:200000
3. The load balancer is not maintaining persistence so calls for each quadrant data are being routed to multiple UI servers.
   - If using dev tools or fiddler this may result in aborted or 404 errors being returned to the client.
   - Check the load balancer.

6.5   Page Cannot be Found/Loaded/Not Authorized Error

There are two types of page cannot be found errors, the first type is an error returned by IIS and is a standard error message indicate the web page is invalid, this is presented as a "404" page cannot be found error. The second error occurs within the application where it will state "page not found error" within the UI itself.

6.5.1   404 Error

The 404 (IIS) error normally occurs for one of three reasons:
The environment has been installed with/without spaces option and the URL utilized does not match the environment. If using the URL http://xxxx/lnos%20fw%20ui (has spaces) try the following URL instead http://xxxx/lnosfwui (no spaces) or vice versa.

.NET is not properly registered with IIS
This normally is only seen on newly built servers; use the following section to troubleshoot this type of issue:
Installing .NET into IIS

User/Software Error
The URL being utilized is invalid, either the user has entered an invalid URL or the calling application is referring to an invalid URL.

      UI Page cannot be loaded or User Not Authorized Error
      THE PAGE COULD NOT BE LOADED

This error usually occurs when the user is missing a required fngrp to load the form. This can be troubleshooted using the UI tracing process.See UI Tracing or you may need to use DCF SQL Tracing if the fngrp is not obvious.

Adding the missing fngrp to a users existing role (typically custom) or creating a new (custom) role and assigning it the user and group will resolve this issue.

6.5.2   ListKey Popup Error COM error 2147023878
Immediately upon logging in, a user may be presented with the following error message:

GetLocaleListKey failed: An Internal Error has occurred. The process could not be completed. Function Login.ListKey.list. COM Error -2147023878 : Illegal operation attempted on a registry key that has been marked for deletion.
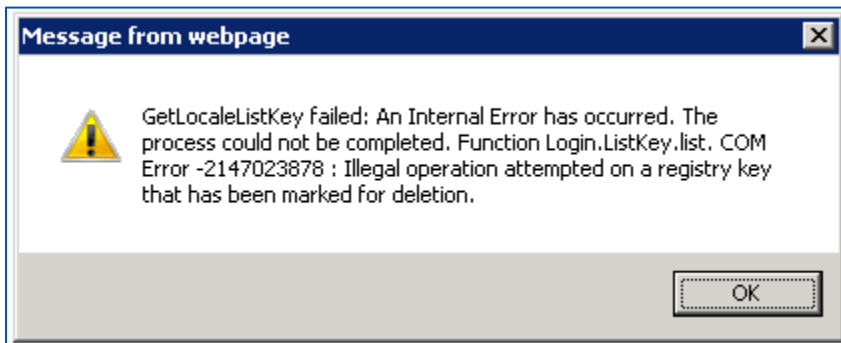
This error usually indicates registry corruption, sometimes a restart of the DCF System will resolve the issue. Most times the server needs to be rebooted to let the registry transactions finish.

A re-install may be required. Contact Descartes for more support.

6.5.3   MSXML COM Error 2147457259 Expression Must Evaluate to a Node-Set
Immediately upon login, users may notice the following error in the top right corner of the dashboard:

[MSXML4.DLL: COM ERROR -2147457259: Expression must evaluate to a node-set. <--]
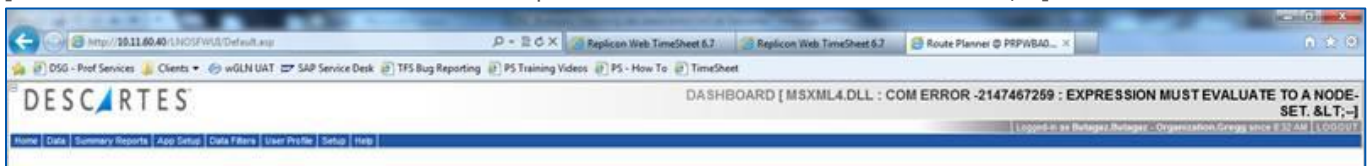
This error is caused because no valid license has been installed for the organization.

Verify License is installed:

1. Check LNOSLic database.
2. USE LNOSLic,
3. Select * from dbo.License.
4. Verify the GLNOrgID associated with the org has a valid row.

Verify GLNorgID is associated with the Org (DCF Database):

1. USE DCF.
2. Select * from dcforg.
3. Verify GLNOrgId is populated for the company being logged into. Ensure the GLNOrgId matches the license that was installed.

The most common cause is the license was associated with the default (FW) organization but not the other organizations.

Verify GLNOrgID column is populated in the DCFOrg table in both the "DCF" and "Security" databases.

1. USE DCF.
2. Select * from dcforg.
3. Verify GLNOrgId is populated for the company being logged into. Ensure the GLNOrgId matches the DCF database.
4. If missing, this normally occurs when a backup is restored from an older version.

To resolve Issue #1: Follow installer instructions to setup a new license.

To resolve Issue #2:

1. Open LNOSSetup.
2. Navigate to the **Database Information** tab.
3. Click **Update GLNOrgID**.
4. Specify org ID. This will correct both the DCF and Sec databases.
5. Repeat for each org OR use the **Apply GLNOrgID to All** option

To resolve Issue #3:

1. Open LNOSSetup.
2. Navigate to the **Database Information** tab.
3. Click **Update GLNOrgID**.
4. Specify org ID, this will correct both the DCF and Sec database.
5. Repeat for each org OR use the **Apply GLNOrgID to All** option.

6.6 Schedule Locked by Another Process

Certain operations (e.g. **Clear Schedule**, **Copy Schedule**, etc) may fail with the error "Schedule is Locked By Another process". This error occurs when the operation requires exclusive access to a schedule or object. This lock is independent of the SQL locking. Every operation involving the optimizer creates a lock on the schedule or a set of resources/orders in that schedule.

For example:

- Optimize All/Selected locks the entire schedule
- Resequence locks the route
- Create/Update/Delete order locks the order

When another function attempts to perform an operation requiring exclusive access the first step, it performs is to query the lock table and if OK it will create its own lock. If there are blocking locks, it will fail returning the error "Schedule is Locked by Another Process". If transactions are competing for the same route/stop, this is managed through normal SQL locks and it is only intended to block schedule vs route/stop operations.

For example:

- if a user is running an **Optimize All**, order imports will fail
- if a user is clearing a schedule and orders are being imported/updated the clear will fail

Once the locking operation is finished it will delete the lock record. If however the process crashes or is abnormally terminated (e.g. process kill) this lock may not be cleared.

To see a list of active/old locks the following query can be used:

```sql
select sch.ScheduleKey,ols.*,ss.*
from fwschedule sch
left join FWOptLockStatus ols on sch.ScheduleID=ols.ScheduleID
left join FWSessionStatus ss on ols.SessionStatusID=ss.StatusID
where sch.ScheduleKey='xxx'
```

Due to these locks, it is important to avoid conflicts between users for certain operations (e.g. **Clear Schedule**). A dedicated "recycling" or "clearing" schedule should be created per branch / user / region to avoid conflicts between users.

To help investigate when this is occurring API tracking can be enabled through System Values (Note: this setting is cached) and then the following query can be used to find all tracking events that occurred near to the time of the problem.

NOTE: This does not guarantee a locking event did not occur.

```sql
declare @cleartime datetime
declare @schedulekey nvarchar(50)
set @cleartime = 'YYYY-MM-DD hh:mm:ss'
set @schedulekey = 'xxx'

select ot.* from FWOrder o
join FWOrderTracking ot on o.OrderID=ot.OrderID
where o.ScheduleKey=@schedulekey and ot.CreateDate between DATEADD(n,-2,@cleartime) and
DATEADD(n,2,@cleartime) -- +/- 2 minutes
```

```
select rt.* from FWResource r
join FWResourceTracking rt on r.ResourceID=rt.ResourceID
where r.ScheduleKey=@schedulekey and rt.CreateDate between DATEADD(n,-2,@cleartime) and
DATEADD(n,2,@cleartime) -- +/- 2 minutes


select scht.* from FWSchedule sch
join FWScheduleTracking scht on sch.ScheduleID=scht.ScheduleID
where sch.ScheduleKey=@schedulekey and scht.CreateDate between DATEADD(n,-2,@cleartime) and
DATEADD(n,2,@cleartime) -- +/- 2 minutes
```

If this query does not provide further insight a SQL trace as described in the "How to - SQL Tracing for LNOS Applications" document should be performed. This trace should be filtered to UI, BIF, DFL, BE servers (BGO servers do not lock, DFL/BE servers only apply to customer using a full install, typically hosted).

6.7 Display Error Code 12002 on Asset Save

Issue :
The drivers added on the Descartes Route Planner user interface could be found on Descartes wGLN, but shows Error Code:12002

Symptoms :
Includes, after clicking **Save** or **Save and Close** button and returning to the list of drivers, the added driver can be found on the list.(And it can be also found on wGLN.) If you open that driver's detail by selecting **Edit Driver**, "Error Code:12002" is shown in the wGLN Response column.

Select the driver and click **Publish to wGLN**. The system returns the pop-up window saying "Publish Failed" and Error code:12002.

Reason:
12002 error is reported by MS wininet API, which basically says that http connection timed out.

Solution:
wGLN->RP driver synching enabled?. If yes.

Synching should only be enabled in one direction Descartes Route Planner to Descartes wGLN or Descartes wGLN to Descartes Route Planner and right now it is enabled in both. Asset add/update/delete, driver add/delete/update should all be unchecked if you are using publish to Descartes wGLN in Descartes Route Planner.

This creates an endless loop and will cause a timeout when trying to synch the driver to Descartes wGLN. Descartes Route Planner synchs to wGLN, which triggers an update to Descartes Route Planner which triggers a synch to Descartes wGLN and so on. Each is waiting on the previous to complete until the system hangs.

7   Licensing Problems

7.1   License State Data is Too Old

This issue indicates the batch processor is not operating correctly. When running, the batch processor performs a license check approximately every one hour. A server in this state will eventually expire a license in approximately seven days. When that occurs the error message will be License grace period will expire in X days.

7.1.1   Troubleshooting Steps

1.   LNOSLic and DCFHost
Check to make there are not duplicate LNOSLic entries in the DCFHost table, this will prevent the license from operating correctly and can prevent installation of a new license.

2.   Batch Processor
Check to ensure batch processor is running, if it is check the log to ensure errors are not occurring (c:\lnos\lnosfwbatchprocessor\logs).

Exception occurred while connecting to LNOSFW database for organization 'orgname/company name'. Backend calls will not be sent for this organization: System.Exception: Cannot find LNOSFW login account to use for BatchProcessor service. Skip this organization for further processing.at FWBatchProcessor.OrgRegistry.RefreshFromDB()

This exception indicates that either the value for the keyword "BatchProcessorLogin" in the CtySysValue table is missing or has a wrong value.

Check to ensure the CtySysValue entry BatchProcessorLogin has the correct value (App Setup>System Values) You can add or correct the value with the appropriate valid RP Login Name.

It is also possible that the record "BatchProcessorLogin" is missing, then you should add the record to the CtySysValue table by running the following query in the FW DB:

```
Declare @login NVarChar(256)
Declare @maxid Int
Set @maxid=(Select Max(SysValueID)+1 From CtySysValue)
Set @login='abc'
If Not Exists(Select SysValueID From CtySysValue Where Keyword='BatchProcessorLogin')
        Insert Into CtySysValue Select @maxid, 0, 0, @login, 1, GetDate(),
'BatchProcessorLogin', 'LNOSFW'
```

REPLACE 'abc' with the login account (normally fw-admin).

In addition, sometimes, you will see multiple records of the same. In this case, keep the appropriate record and delete the unwanted.

It is possible the URL in the FWBatchProcessor.exe.config (**LNOS > LNOSFWBatchProcessor**) file is not correct. Open the Log (**LNOS > Log**) and check the current days log for the following error:

```
12.06.2013 13:27:51 [FW][CheckPeakUsage] Exception occurred while processing response from
CheckPeakUsage': System.NullReferenceException: Object reference not set to an instance of
an object.
    at FWBatchProcessor.CheckPeakUsage.ProcessResponse(FWOrg org, String response)
12.06.2013 13:27:51 [FW][CheckPeakUsage] Exception occurred while executing CheckPeakUsage:
System.NullReferenceException: Object reference not set to an instance of an object.
    at FWBatchProcessor.CheckPeakUsage.ProcessResponse(FWOrg org, String response)
    at FWBatchProcessor.Task.ProcessOrg(FWOrg org)
    at FWBatchProcessor.Task.ThreadPoolCallback(Object threadContext)
```

If found navigate to LNOSFWBatchProcessor.exe.config:

1. Open in notepad.
2. Find URL: http://localhost/LNOS FW UI/core/ctyxmlinterface/ctyinterfacesccl.ctyxmlcc.asp
3. Test URL in browser.
4. If there is an error correct URL (most likely spaces need to be removed).

3.   DCFConnection

Ensure that a record exists for LNOSLic in DCFConnection in the DCF Database for the current organization.
If not you will need to create one via SQL.

```sql
USE DCFxxx

INSERT INTO DCFConnection
(Name,Description,Level1ID,Level2ID,Level3ID,Level4ID,Type,HostID,ModifiedBy,ModifyDate)
SELECT NULL, NULL, 0, 0, 0, 0, 'LNOSLic', HostId, 0, GETDATE()
FROM DCFHost WITH (NOLOCK)
WHERE Name = 'LNOSLic'
```

Replace xxx with your corresponding environment code.

Conclusion

After resolving the root cause, restart the FWBatchprocessor service and check for the batchprocessor log to verify that any exception/error has disappeared from the log. The **License Warning - License State Data is Too Old** will either disappear immediately or after 1h from the re-start of the FWBatchProcessor service License grace period will expire in X days. Licensing errors/warnings are displayed in the top right corner of the users dashboard but may be truncated.

To get the full error message use the "Check Normal License State" command XML example below via the core/admintools pages.

NOTE: If a user is not licensed for Google™ or the license has expired Google Maps™ will be automatically deactivated and the user will see the LMB maps instead.

7.1.2 Common License Errors

There are several common error messages:

Error	Explanation
MSXML COM Error 2147457259 Expression must evaluate to a Node-Set	See MSXML COM Error 2147457259 Expression must evaluate to a Node-Set for more details
License grace period will expire in X days.	This means the license has already expired, the only resolution is to install a new license from support prior to the Xth day, if this is not done certain functionality will stop working. There are several reasons why this can occur: • Customer is in violation of the license (e.g. too many trucks) • Batch processor was not running for at least 8 of the last 15 days • Batch processor was running but login account was invalid For the latter 2 reasons this can usually be verified by reviewing the batch processor logs.
WARNING: License **state data** is too **old**	This indicates the **batch processor** is not operating correctly, when running the batch processor performs a license check approximately every 1 hour, a server in this state will eventually expire a license in ~ 7 days, when that occurs the error message will be License grace period will expire in X days. See Investigate License State Data is too old for more details on how to investigate this.
LNOSFW License data was compromised (Type 3)	Occurs when the latest license check time in the db is **older than** the last check time logged at **an app server registry by three or more days**. Normally that shouldn't happen. The most likely cause is a database restore that is more than 3 days old (e.g. sql server migration using an old db backup).

License is invalid or compromised (LICENSE_CRITERIA_VALUEMISMATCH).	**Occurs when the environment details don't match the installed license file, this usually happens if:** **SQL server name is changed** **A new license is required.** **DCF database name is changed** **A new license is required.** **Environment is pointing at the wrong license db** **typically only happens in a "shared SQL" environment** **The License db's in the environment can be queried using:** **use DCF** **select** **h.hostid,h.name,h.databasename,h.servername,c.type,c.level1id** **from dcfhost h** **left join dcfconnection c on h.hostid=c.hostid and c.Type='LNOSLic'** **where h.name like '%lnoslic%' or h.databasename like '%lnoslic%'** **Example Output from an incorrectly configured environment, this from "demo3" so the dbname should have been LNOSLic3**

hostid	Name	DatabaseName	ServerName	Type	Level:
5	LNOSLic	LNOSLic3	demodbca01\demo10	NULL	NULL
25	LNOSLic	LNOSLic	demodbca01\demo10	LNOSLIC	0

There should only be 1 result and it should be the expected database name/servername.
Type/Level1ID of NULL indicates there is no connection to the database.
extra entries should be removed
the remaining entry should be updated to match the correct environment details.
open installer after, if not correct update the db in the database setup tab

NOTE: For full/hosted installs the registry may need to be manually updated at HKLM\Software\[Wow6432Node\]DCF\LNOSLic\@CompanyName_DBName
Example was resolved with the following queries:
update dcfhost set databasename='LNOSLic3' where hostID=25
delete from dcfhost where hostID=5

Warning: Max Number of Routes has exceeded license limit	This warning occurs when there is at least one occurrence in the last X (currently 7) "routing" days (not necessarily calendar days). If the number of occurrences goes over a defined threshold (determined by engineering) the license will be invalidated and the 30 day

	countdown will begin until the license is invalid and the application will stop working.

Common License Troubleshooting XMLs

NOTE: These are posted against the core listener http://server/STAD/Core/CtyXMLInterface/DCFListener.asp

7.1.3   Check Normal License State:

Input XML:

```
<?xml version='1.0' ?>
<Command>
<Header>
<Authentication>
<CompanyName>FW</CompanyName>
<GroupName>Admin</GroupName>
<LoginName>fw-admin</LoginName>
<Password>cs</Password>
<AccountNo></AccountNo>
</Authentication>
</Header>
<Execute>
<Function>
<ApplicationCode>LNOSFW</ApplicationCode>
<MenuName>LNOS Reservations</MenuName>
<ModuleName>FWLicenseControl</ModuleName>
<FunctionName>CheckLicense</FunctionName>
</Function>
<Parms>
<Input>
<parmTask>1</parmTask>
</Input>
<Output></Output>
</Parms>
</Execute>
</Command>
```

Bad/warning response:

```
<Output>
<parmMessage>License grace period will expire in 5 days.</parmMessage>
</Output>
<Result>SUCCESS</Result>
```

Check Google™ License:

Input XML:
```
<?xml version='1.0' ?>
```

```
<Command>
<Header>
<Authentication>
<CompanyName>FW</CompanyName>
<GroupName>Admin</GroupName>
<LoginName>fw-admin</LoginName>
<Password>cs</Password>
<AccountNo></AccountNo>
</Authentication>
</Header>
<Execute>
<Function>
<ApplicationCode>LNOSFW</ApplicationCode>
<MenuName>LNOS Reservations</MenuName>
<ModuleName>FWLicenseControl</ModuleName>
<FunctionName>CheckLicense</FunctionName>
</Function>
<Parms>
<Input>
<parmTask>2</parmTask>
</Input>
<Output></Output>
</Parms>
</Execute>
</Command>
```

Good response:

```
<Parms>
<Input><parmTask></parmTask></Input>
<Output><parmHasGoogleGCLicense>1</parmHasGoogleGCLicense><parmHasGoogleMapLicense>1</parmHasGoogleMapLicense><parmMessage></parmMessage></Output>
</Parms>
<Result>SUCCESS</Result>
bad response:
<Parms>
<Input><parmTask></parmTask></Input>
<Output></Output>
</Parms>
<Result>SUCCESS</Result>
another bad response:
<Output>
<parmHasGoogleGCLicense>0</parmHasGoogleGCLicense>
<parmHasGoogleMapLicense>0</parmHasGoogleMapLicense>
</Output>
<Result>SUCCESS</Result>
```

SQL Syntax Issue

One such problem example could be seen in Descartes Route Planner versions 12.1.4.4 or 12.1.4.5., when a user tries to search for an order using the menu **Data > Orders > Advanced**. On this **Advanced Search** page for Orders, if we customized the Orders window by bringing in the column called "Order Status" at the Orders level to be viewed and then performing an Advanced Find will not display any results. That is, a blank page is displayed without returning any results even though the orderkey exists and the user is having access to the schedule in which the order is present. One could determine the SQL Syntax issue by collecting a UI Trace while performing the Advanced Find on Orders. Such bugs should be logged on TFS application with the required information and engineering team informed.

An example UI Trace is pasted below that indicates the failure message and the syntax with SQL. The highlighted portions in yellow color represent the issue. If we look at the SQL statement below, you will notice that the word "Order" should have been before the word "By" to make the correct syntax.

<Input><parmMasterOrder/><parmScheduleKey/><parmCriteria/><parmSelect/><parmPaging/></Input></Parms><Status><Result>FAILURE</Result><Count>0</Count><ResultTime>13-04-18 17:08:34 GST</ResultTime><CommandNo>CMD5F149E61CEAB4FA18C2A5FB37FD1DFEA</CommandNo><AuthServer>Wlcapdb01\brsi:DCFFW3</AuthServer><DataServer>Wlcapdb01\brsi:DCFFW3</DataServer><ElapsedTime>31</ElapsedTime><Message TypeName="**System Error**" Type="**1**" RefCode="**LCA012013041817083411**" ID="**0x3fc**"><Text> **SQL query has failed to execute. Description=**Incorrect syntax near the keyword 'And'.. See Log</Text></Message><SqlTrace><SqlTraceItem><TimeStamp>04/18/13 17:08:34</TimeStamp><ThreadID>7552</ThreadID><CommandClass>CDocOrderDSCmd</CommandClass><Connection>Provider=MSDataShape.1;Extended Properties="SERVER=demodbca01i;DATABASE=FwAcme;UID=fwpresystem;PWD=******;Application Name=FWAcme";Persist Security Info=True;Data Provider=SQLOLEDB.1</Connection><ElapsedTime>0</ElapsedTime><SQL> SHAPE {SELECT DISTINCT FWRoute.RouteID as RouteID,FWOrder.OrderID as OrderID,FWOrder.OrderKey as OrderKey,FWOrder.ItineraryOrderType as ItineraryOrderType, Case When T.NumberOfActivities=2 Then 1 Else 0 End as CanItinerary,FWRoute.ResourceKey as ResourceKey,FWOrder.ScheduleKey as ScheduleKey,FWOrder.Company as Company, Case When FWOrder.Type = 'DROPOFF' or FWOrder.Type='PICKUP' Then (Select Status From FWStop With(NOLOCK) Where OrderID=FWOrder.OrderID) Else (SELECT Top 1 FWRouteHist.Status From FWRouteHist WITH(NOLOCK) INNER Join FWStop S With(NOLOCK) ON FWRouteHist.StopID=S.StopID **WHERE S.OrderID=FWOrder.OrderID Order And FWRouteHist.Status Is Not Null By** FWRouteHist.MessageDate Desc) End as OrderStatus,FWOrder.Status as Status FROM FWOrder WITH (NOLOCK) LEFT OUTER JOIN (Select OrderID, Count(*) As NumberOfActivities From FWActivity With(NOLOCK) Group By OrderID) T On (FWOrder.OrderID=T.OrderID) LEFT OUTER JOIN FWStop WITH (NOLOCK) On (FWOrder.OrderID=FWStop.OrderID) LEFT OUTER JOIN FWRoute WITH (NOLOCK) On (FWStop.RouteID=FWRoute.RouteID) where FWOrder.OrderId in (Select OrderID From (SELECT TOP 20 FWOrder.OrderID,ROW_NUMBER() OVER (order by FWOrder.OrderID) as RowNumber FROM FWOrder With(NOLOCK) WHERE ((FWOrder.OrderKey = N'7524669')) ...SQL>

8   Fixing MSMQ Queue Permissions

In order for the DCF$ services to work the account the service runs under must have read/write for the MSMQ queue (Full is recommended). This error can be identified by going to the LNOS DCF event log and seeing recurring unable to open queue for reading issues (hundreds/thousands per minute). If you see singular failures it just means the service created the queue because it did not exist.

Log Name: LNOS DCF
Source: DCF
Date: 3/6/2014 9:15:56 AM
Event ID: 0
Task Category: None
Level: Error
Keywords: Classic
User: N/A
Computer: UITEST2.descartes.loc
Description:
<DCFException></DCFException>

8.1   To Fix Permissions

8.1.1   Microsoft® Windows® 2003
1. Navigate to **My Computer > Management**, then **Services and Applications > Message Queueing > Private Queues**.
2. Right click the queue, select **Properties**.
3. **Security** tab > **Advanced**.
4. **Owner** tab.
5. Make the Service account or Administrators (group) the owner first. Either select from the list or choose **Add** to select it.
6. Click "**OK**" then "**Apply**" on previous screen.
7. Click "**Add**" and select the service account.
8. Click **Full Control**.
9. Click **OK**.

8.1.2   Microsoft® Windows® 2008
1. Open **Server Manager**.
2. **Features > Message Queueing > Private Queues**.
3. Right click the queue, select **Properties**.
4. **Security** tab **> Advanced**.
5. **Owner** tab.
6. We need to make the Service account or Administrators (group) the owner first, either select from the list or choose **Add** to select it.
7. Click **OK** then **Apply** on previous screen.
8. Click **Add** and select the service account

9. Click **Full Control**.
10. Click **OK**.

Verify that the DCF$ service is running. Then, navigate to the eventlog and ensure recurring errors are no longer in the LNOS DCF eventlog.

9 Interfacing Failures

9.1 Transaction Timeout Investigation

There are several reasons why a transaction may time out. It is important note that just because one action does not resolve the problem it does not mean it was not *a cause* of the problem.

The first step is to identify the problem server. To test an API, use the HTTP Post Test utility included with the application.

In most situations using the RestartCOM utility to restart the solution services resolves the issue. It does not, however, explain why. See Resolve Server Not Responding Issue for details.

There are several potential causes.

Queues enabled without services: If a server has recently been added or an upgrade has been run its possible a queue was enabled that should not be or a necessary queue has been disabled and all calls are serialized which could lead to more than normal timeouts.

For the DocBOL, make sure GCPI queue is disabled or there are services for GCPI. Select * from lnosfw_xxx.dbo.ctysysvalue where keyword like 'usequeuegcpi' or run the lnossetup utility, navigate to the **Options** tab and ensure the "queues on in FW DB" does not include GCPI.

Make sure Rmpi/Opt is enabled and there are services for it. Select * from lnosfw_xxx.dbo.ctysysvalue where keyword like 'usequeuermpi' or run lnossetup utility, navigate to the **Options** tab and ensure the "queues on in FW DB" includes RMPI/Opt. The verify DCF$Opt Svc # are running.

The IIS logs can be used to help pinpoint the frequency, the time logged in IIS is the time the transaction completed or the customer timed out.

On Windows® 2003 these are typically located at c:\windows\system32\logfiles\w3svc1
On Windows® 2008 these are typically located at c:\inetpub\logs\logfiles\w3svc1

Using a tool like log parser can make this analysis much simpler.

9.2 Server HTTP Error Received

When interfacing a server error can occur, this usually occurs because of a bug in the ASP pages or incorrect permissions.

Prior to determining the cause however the problem server needs to be identified:
Identify Interface Server

Similar to the UI, the issue can be tested via:
Login Page displays white screen
Login Page Server Error

but using the "STAD" UI instead.

This issue can also occur because the transaction caused an unhandled exception. It is usually data/transaction specific (although it could affect subsequent transactions). If this can be isolated to a transaction it is important to get the transaction that caused the failure from the customer.

You can also use IIS Tracing to get more details. This issue could be related to a command failing. Further investigation can be done by following the Common Error messages.

The IIS logs can be used to help pinpoint the transaction, the time logged in IIS is the time the transaction completed or the customer timed out.

On Windows® 2003 these are typically located at c:\windows\system32\logfiles\w3svc1
On Windows® 2008 these are typically located at c:\inetpub\logs\logfiles\w3svc1

Baregrep is a very useful utility for quickly analyzing IIS logs looking for errors. See BareGrep IIS Parsing for more details on this.

9.3   Core Interface Returns <Root>DCF HTTP Listener</Root>

When posting to the core listener it is possible to receive a response of <Root>DCF HTTP Listener</Root>. This response is the same response you receive if you open the URL in a web browser. The primary reason this response is received is because the XML request is not valid (invalid characters, incomplete XML, no XML at all).

Another reason this issue might occur is if a request is sent to an HTTP URL and a 301/302 response is sent to the client (e.g. to redirect them to HTTPS). In this case, the "body" of the request (the XML) will be dropped but the URL will still receive a POST (depending on the client).

If the XML succeeds when posted against individual nodes but returns <Root>DCF HTTP Listener</Root> against the load balancer, check to confirm that the correct protocol is being utilized. Using a tool like wfetch will allow you to see the explicit response received from the website without the interpretation of the client.

```
▶ started....
⊖ resolve hostname "                    "
⊖ WWWConnect::Connect("            ","80")\n
⊖ source port: 50220\r\n
ⓘ REQUEST: **************\n
Ⓡ POST /lnosfwui/Core/CtyXmlInterface/CtyInterfacesCCL.CtyXMLCC.asp HTTP/1.1\r\n
Ⓡ Host:                    \r\n
Ⓡ Accept: */*\r\n
Ⓡ Content-Length:879\r\n
Ⓡ \r\n
Ⓡ <?xml version="1.0" encoding="utf-8"?> <Command> <Header> <Authentication> <CompanyName>     </CompanyName> <GroupName>Admin<...
Ⓡ fwadmin</LoginName> <Password>cs</Password> </Authentication> </Header> <Execute> <Function> <ApplicationCode>LNOSFW</ApplicationC...
Ⓡ eservations</MenuName> <ModuleName>DocRouteEditTask</ModuleName> <FunctionName>UpdateStatus</FunctionName> </Function> <Parms...
Ⓡ cRouteEditTask> <DocRouteEditTask Area="NoAreas" Type="PLANNER" ServiceName="PLANNER@localhost"> <FWRouteEdit DriverKey="3254" Resour...
Ⓡ to city" LastReportedDate="2015-07-13T13:47:00" LastReportedLatitude="          " LastReportedLongitude="          " Speed="22.9605489610153...
Ⓡ tion="SouthWest" UnScheduledStop="0" /> </DocRouteEditTask> </parmDocRouteEditTask> </Input> </Parms> </Execute> </Command>
ⓘ RESPONSE: **************\n
Ⓗ HTTP/1.0 301 Moved Permanently\r\n
Ⓗ Location: https://                         /lnosfwui/Core/CtyXmlInterface/CtyInterfacesCCL.CtyXMLCC.asp\r\n
Ⓗ Server: BigIP\r\n
Ⓗ Connection: Keep-Alive\r\n
Ⓗ Content-Length: 0\r\n
Ⓗ \r\n
⊖ WWWConnect::Close("            ","80")\n
⊖ closed source port: 50220\r\n
◀ finished.
```

9.3.1 DCF Package Not Resolved Investigation/Resolution

The core listener should always normally return: <Root>DCF HTTP Listener</Root>

This error may be detected by a load balancer or while investigating other issues (e.g. unable to login).

- Open browser and point to http://[APPUI]/Core/CtyXMLInterface/DCFListener.asp.
- If healthy, the listener will return <Root>DCF HTTP Listener</Root>.
- If unhealthy, the listener will either not return or return <Root>DCF Package Not Resolved</Root>.
- Use RestartCOM and choose **Restart DCF System**.
- Retest.
- Open browser and point to http://[AppUI]/Core/AdminTools.
- Click the **Application Variables** button.
- Search for **Cache:DCFCoreCCL.DCFCoreCC**. Make sure it says "OK" and not "INVALID".
- If "INVALID" either the COM+ is incorrectly setup and needs to be rebuilt or the cache is bad.

To rebuild the component:
- See Rebuild DCF COM+ Application.
- To fix the cache: click **Flush Cache** and **Reload Application**.
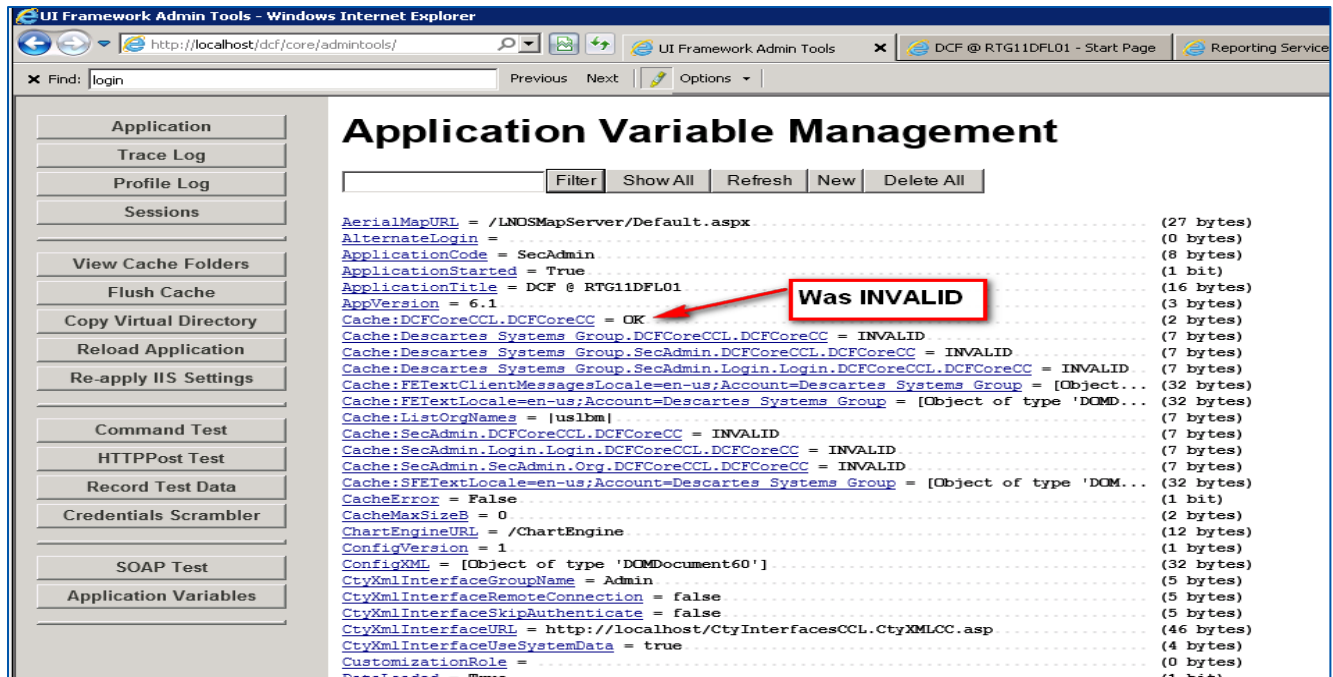
Recheck to confirm it is now **OK**.

If it is a Microsoft® Distributed Transaction Coordinator® security issue:
1. Open component services, right click on My Computer.
2. **COM Security** tab: under Launch and Activation permissions, click **Edit Limits**.
3. Choose **Everyone** and enable remote launch and remote activation; click **OK** to save.
4. Restart IIS (start > run, type "iisreset").
5. Test the listener. If it works, go back and remove these permissions. Click **OK** to save.
6. Restart IIS. Confirm if listener works.

Config.xml is incorrect
- Check the http://localhost/[APP]/core/admintools, if you see *Cache:CtyInterfacesCCL.CtyXMLCC.1.DCF = INVALID*
- Look at the DCFProgID in the config.xml here, C:\Inetpub\wwwroot[APP]\GeneratedFiles. It was CtyInterfacesCCL.CtyXMLCC.1.DCF whereas it should be CtyInterfacesCCL.CtyXMLCC, then test again.
- Post to http://[server]/[app]/Core/CtyXmlInterface/CtyInterfacesCCL.CtyXMLCC.asp e.g. http://lnosbgobrsi03/LNOS%20FW%20UI/Core/CtyXmlInterface/CtyInterfacesCCL.CtyXMLCC.asp should return <Root>DCF HTTP Listener</Root>.

9.3.1.1 Rebuild DCF COM+ Application

The DCF COM+ application should have three sub-components. If this is not the case, DCF COM+ needs to be rebuilt manually. The following picture illustrates the difference between a properly created DCF COM+ Application and a incorrectly created or corrupted component.
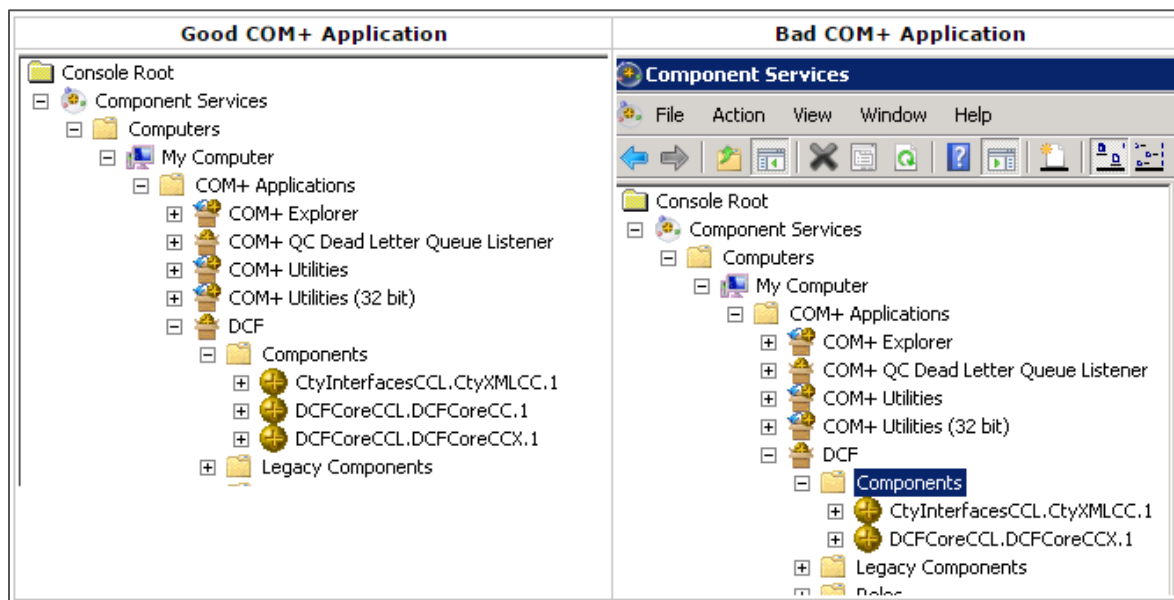
Steps to resolve DCFCoreCCL.DCFCoreCC.1 or DCFCoreCCL.DCFCoreCCX.1 is missing:

1. Open component services.
2. Navigate to my computer>COM+ Applications.
3. Expand DCF.
4. Expand components.
5. Delete the DCFCoreCCL* components (there is only one but should be two):
6. Right click components and select **Install Components**.
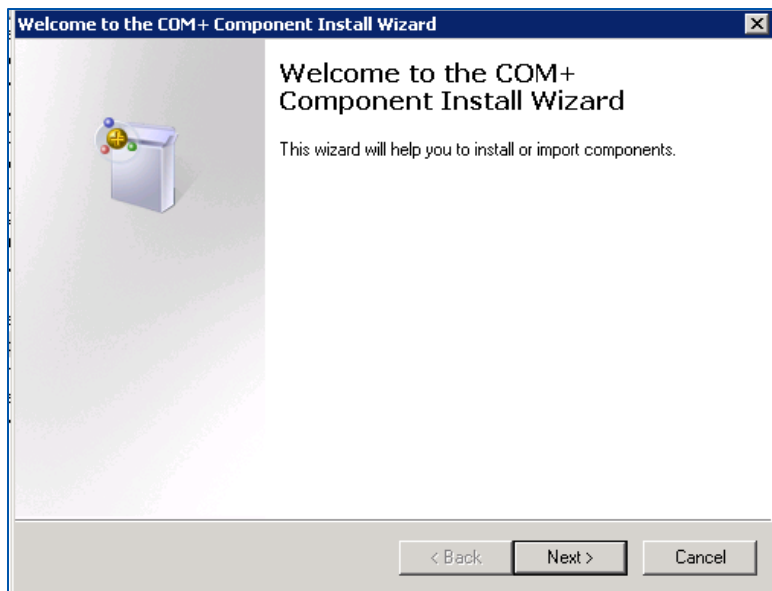
7. Click **Next**.
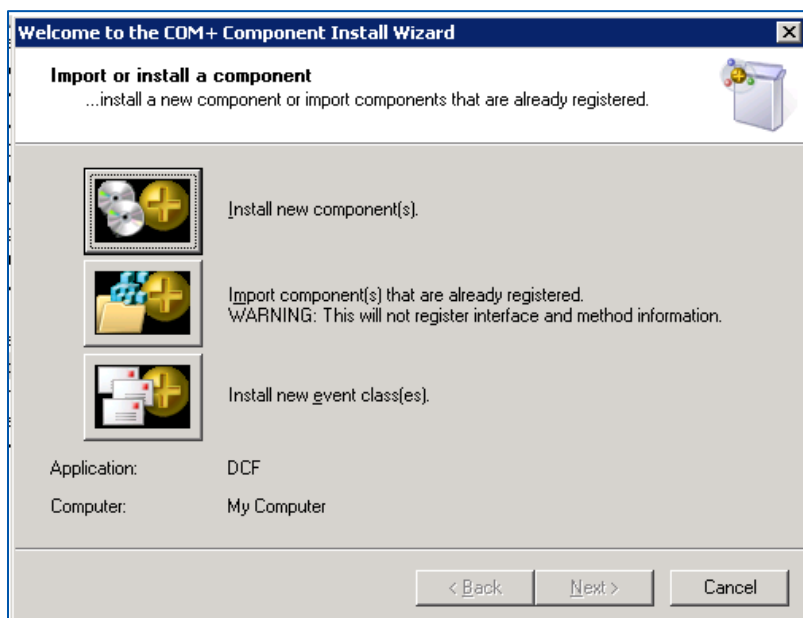
8. Click **Install New Component(s)**.
9. Search for dcfcoreccl*.
10. Select DCFCoreCCL.dll and DCFCoreCCL.tlb.
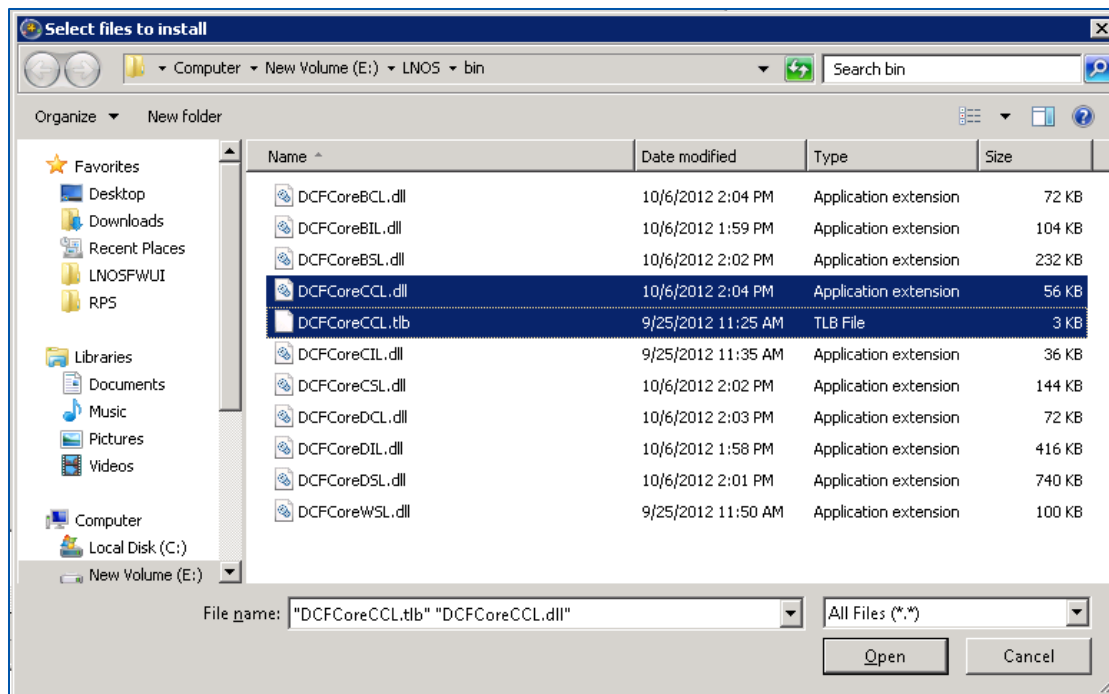
11. Click **Next**.
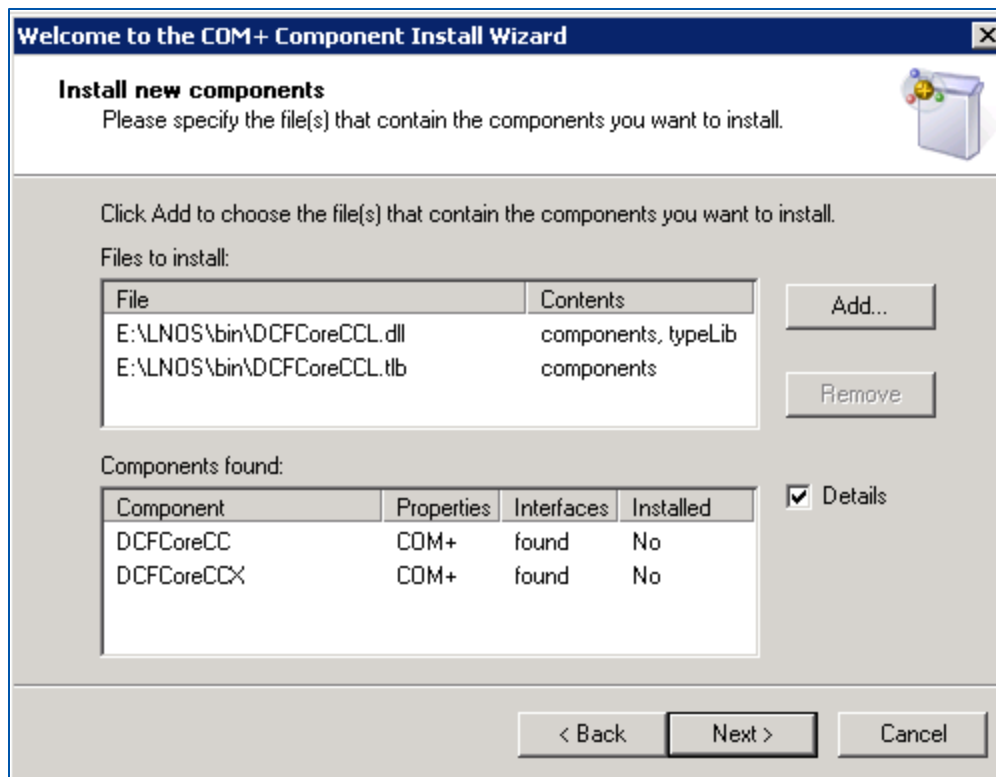
12. Click **Finish**.
13. When complete, the file strucutre should display as follows.
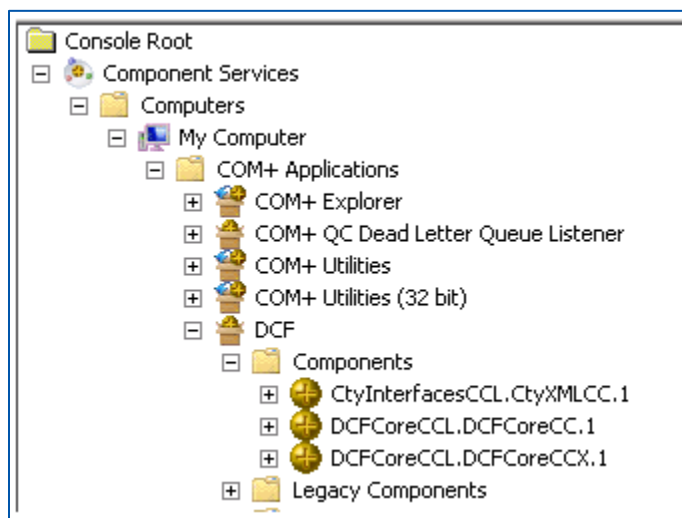
14. Use RestartCOM and click **Restart DCF System**. A reboot may be required.

Steps to resolve CtyInterfacesCCL.CtyXMLCC.1 is missing:
1. Follow steps 1 to 11 in the preceding section.
2. Search for CtyInterfacesCCL*.
3. Select CtyInterfacesCCL.dll and CtyInterfacesCCL.tlb.
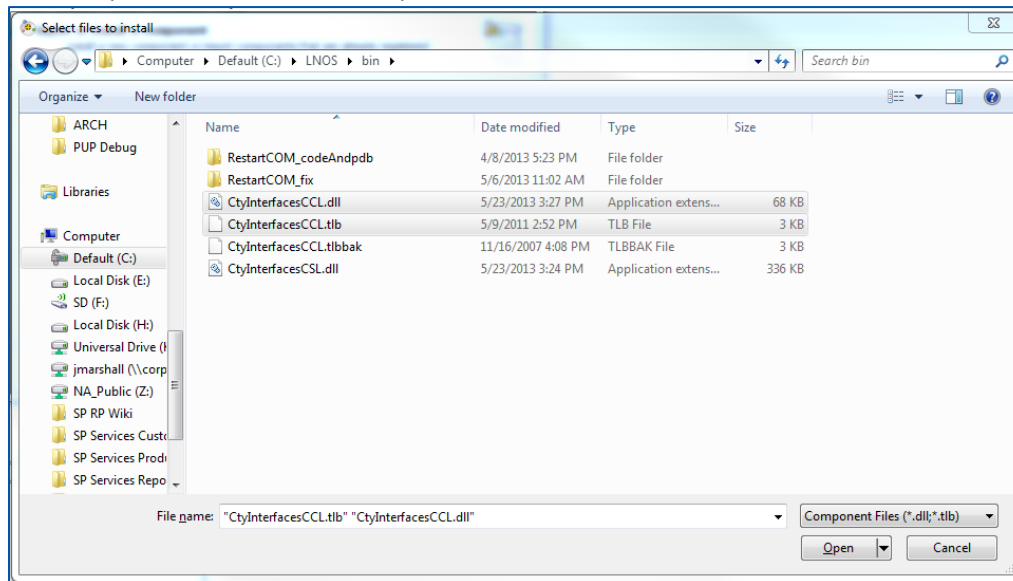
4. Click **Next**.
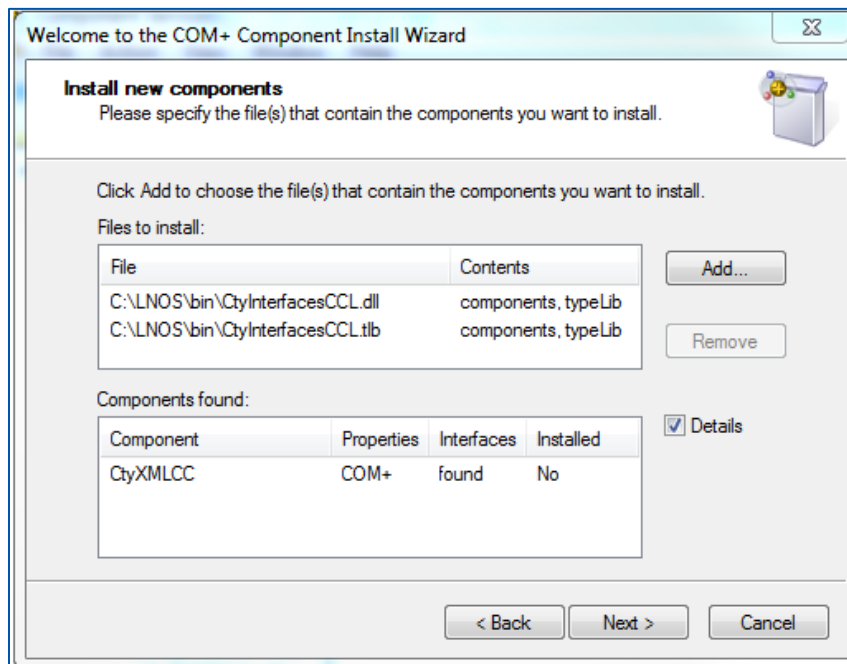
5. Click **Finish**.
6. When complete, the file strucutre should display as follows.
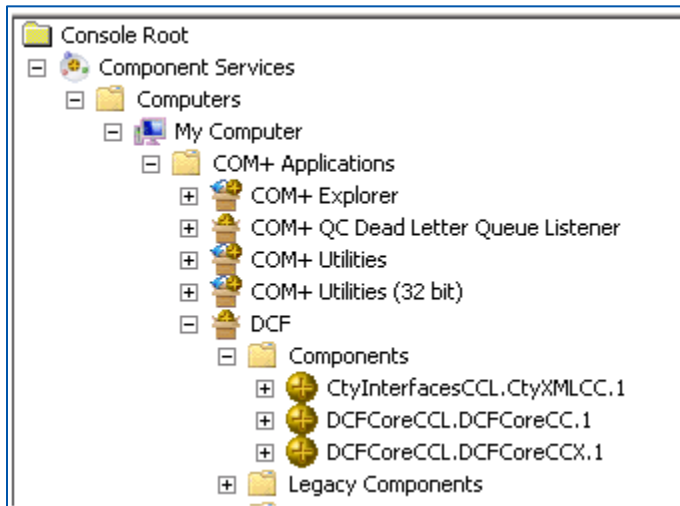
7. Use RestartCOM and click **Restart DCF System**. A reboot may be required.

10 Command Failure Messages

10.1 Common Error Messages

Error Description	Common cause/escalation requirements
%deadlock%	This error is usually a bug or a customer running "bad" custom queries. It requires escalation to engineering if occurring with a high frequency, it is usually not easily reproducible.
transaction log is out of space	This error message returns because the database server is not backing up the transaction logs and is configured for full recovery OR the database server ran out of disk space. Escalate to the DBA's responsible (internal or external).
DCF Package not resolved	Investigate and Resolve "DCF Package Not Resolved"
Invalid Login. Please check you login name and password, and try again	User not in the expected user group, possibly user edited in subscriber table. Check DFL config and user group. Improperly setup usergroup (ie no importer). By any chance, if customer is using 'strong password', make sure that that users password does not expire.
SQL query has failed to execute. Description=**String or binary data would be truncated**.. See Log	The characters being inserted in the database is greater than the maximum allowable characters for the column. Check the Input XML against database schema, escalate to customer.
the INSERT statement conflicted with the FOREIGN KEY constraint xxxxx in the database yyyy	Make note of the table/column. This can usually be inferrred by the FK name FK_[table]_[column], usually means a piece of data was not created before referencing it or the XML is inconsistent or there is a bug.
failed to insert **duplicate** ... **DocLocation** ... On a DocBOL	Race condition, resubmit the XML
failed to insert duplicate ... docloation ... on a DocLocation	Location already exists
invalid object name **'CtyTSLogin'**	Same as invalid login
Invalid object name **'CtyMsgProperty'**	Same as invalid login

FAILURE with no message (Listeners only)	This error can be hard to investigate. If reproducible, use the Listener Tracing page to get the full error message. If not reproducible there is a chance the real error was recorded in the CtyMsgLogParm table in the security database. Using the CommandNo from the response XML a lookup can be performed. **NOTE:** Some listeners (e.g. DocRequestTaskPublishListener) invoke multiple DCF commands, the commandNo returned may not always be the one needed to trace the issue. <CommandNo> CMD4880A0AE2D7A4FF88FCE67C47650A5C6 </CommandNo> <AuthServer>demosql:DCFFW</AuthServer> <DataServer>demosql:DCFFW</DataServer> <ElapsedTime>406 </ElapsedTime> <Message></Message> <STADMessage> <Message></Message> </STADMessage> <Result> FAILURE </Result> A common cause of this problem is an invalid login.
Attempted to read or write protected memory. This is often an indication that other memory is corrupt.	Usually occurs when a service crashes. Escalate to engineering. Performing a service restart may eliminate the problem. The error could also be data related. If new server was recently added to the environment or the databases were restored from another environment it could be a drive letter issue: Compare drive letter against existing servers Compare drive letter on server returning error against the INI file paths: USE LNOSFW_xxx; select * from CtySysValue where keyword like '%ini%' Compare drive letter on server returning error against the queue storage path: use DCF; select * from DCFQueue where Name like 'lnosgeo%' or Name like 'lnosfw%' If the drive letter is wrong Descartes Route Planner will need to be uninstalled and reinstalled. Contact Descartes for support.
Malformed Resolve command: Error:**Not Found**;	If this error occurs with an order (DocBOL) import, this error refers to an error with geocoding. The order location must have the lat and long provided OR the location address must be validated prior to import. Currently there is a bug in FW even though the setting for allowing bad location is turned on, it'll still fail. (Menu: App Setup/Sys Value. SaveBadLocation=1) End of added content

Malformed Resolve command: Error:Internal Server **Error**;	This refers to an error with geocoding **DocGeocodeTask.Resolve**. This error usually occurs on the **DocFWLocationListener**, when a location is being imported the first step is to geocode the location, then it creates the record in the database. If this error occurs the first step is to check the gcpi.ini file for map files matching the state of the location record, if they exist then enable the debug files by uncommenting out the following lines (removing the semi colon ;) in the debug section: [Debug] ;GCPIFile=xxxxx ;GCPIOutputFile=xxxx In the example where this was identified, the **gcpi.ini** file had only the demo map file configured (n7mn_hennepin_county.lmb) which only includes a subset of the state of Minnesota and the geocode request was for the state of California, the location record did not contain a zip file so LZB resolution was not an option, in this case **the geocode was requested for a state where there was no map** data at all. **NOTE:** If using ReturnCommandXMLOnly=true only the geocode command XML is recorded, the location add/update command XML is not logged.
Pipe connect operation timed out. FAILED - **Named pipe failure**: The pipe has been ended.	This error occurs when using queued API's, in Descartes Route Planner this can occur on UI tasks when a call that goes through the various API queues does not return a response within the timeout threshold (typically 300/600 seconds). This can occur for several reasons: **Queue service is not running.** Queue service does not have permissions to the queue. Check LNOS DCF eventlog for recurring "unable to open queue for reading" errors for the queue in question. **Queue service crashed** and did not return an error There is a bug (or task) causing the optimizer to take more than the timeout to complete . **More requests are received than can be processed** by the number of services available. #1/2 will probably result in non-decreasing MSMQ queue count #4/5 will probably result in a non-0 MSMQ count that is decreasing too slowly.

SQL Query has failed to execute. Description=**Ambiguous column name 'xxxxxx'**… See Log	This error indicates there are two tables in the query with the same column name and it is being references without indication which is the table to check. This error usually occurs in criteria statements (e.g. scheduled tasks) after an upgrade or when a user adds a new column to their dashboard that is not properly supported by the application. In the case of the user it is necessary to identify and remove the column. If a new column was recently added that would be the first place to check. If immediately following an upgrade it may be necessary to reset the user's column layout. If this fix does not work, a column by column test may be required. A UI trace can be used to help identify which to try as generally the SQL column name is similar to the name in the UI. In the case of a criteria statement, running the command without the criteria is a good way to determine if it is a bug (core SQL) or related to the custom criteria. If custom criteria is the problem qualifying the column using [table].[column] notation will resolve the issue. This should be done using the full tablename (e.g. **FWStop**.activityid) or its common alias (**S**.activityid)
RMPI is **unable to open configuration file** [drive]:\lnos\bin\xxxxx	This error occurs because the optimizer INI file could not be found, either because it does not exist or is in the wrong folder/drive or has the wrong name. Rmpi1_OptAsync_Q1.ini - this file used to be called Rmpi_OptAsync_Q1.ini, the installer does not always rename this file correctly. Manually renaming it usually solves the problem. INIs\[org]\xxxx - make sure the org-specific INI folder exists, if it does not, copy from another server of the same type (UI, BIF, BGO). If no path is provided it means the DCFProcess record in the DCF database is incorrect. The description should contain the CtySysValue keyword. If the drive letter is wrong (new server, restored database) either correct the CtySysValue entries to point to the appropriate drive or uninstall and reinstall. Compare drive letter against existing servers Compare drive letter on server returning error against the INI file paths: USE LNOSFW_xxx; select * from CtySysValue where keyword like '%ini%' Compare drive letter on server returning error against the queue storage path: use DCF; select * from DCFQueue where Name like 'lnosgeo%' or Name like 'lnosfw%' If the drive letter is wrong. Descartes Route Planner will need to be uninstalled and reinstalled. Contact Descartes for support.

<Text>Unexpected condition: <DCFException><DCFCodeBookm ark Class="NA" Method="getRmpiConfig" File=".\RmpiLegacyTaskBS.cpp" FileTimeStamp="1900-12-31T00:00:00" ClassTimeStamp="1900-12-31T00:00:00" Line="5748"/><TransactionID>{E 507AF04-A0B7-46F9-88D3-594FCDA7B521}</TransactionID> <Parameter Name="text" Value="**Keyword: RmpiINI5_OPTUI_Q1 not found**. and connectionString is SERVER	The CtySysValue entry is missing for a given INI file/process. This error normally occurs when a database is moved from one environment to another with a service configuration mismatch (e.g. 3 optui in preprod and 9 in prod). This can usually be resolved by running the Diagnostics/Register COM option from the finish tab of the installer on the server reporting the error. The following query will automatically identify and create the missing INI file entries and will also correct the optasync INI file entry if its incorrect. use Fw**Acme** -- fix optasync ini record update CtySysValue set Keyword='RmpiINI1_OPTASYNC_Q1' where Keyword like 'RmpiINI_OPTASYNC_Q1' and (select COUNT(*) from CtySysValue where Keyword='RmpiINI1_OPTASYNC_Q1')=0 -- identify missing ini entries and create them insert into CtySysValue (SysValueID, AccountID,GroupID,Value,ModifiedBy,ModifyDate,Keyword,KeyGroup) select mv.mv+ rank() over (order by p.name) [SysValueID], AccountID=0, GroupID=0, Value=isnull(ini.Value,replace(ini2.value,'1_',substring(p.Description,charin dex('_',p.Description,1)-1,1)+'_')), ModifiedBy=-1, ModifyDate=GETDATE(), Keyword=p.Description, KeyGroup=ini2.KeyGroup from DCF**RTG8**.dbo.DCFProcess p left join (select * from CtySysValue where Keyword like '%ini%') ini on p.Description=ini.Keyword left join (select * from CtySysValue where Keyword like '%ini1%') ini2 on p.Description like '%'+substring(ini2.keyword,charindex('_',ini2.Keyword,1)+1,99) join (select MAX(SysValueID) mv from CtySysValue) mv on 1=1 where (p.Description like 'adapiINI%' or p.Description like 'RmpiINI%') and p.Description != 'RmpiINI_OPTASYNC_Q1' -- bad service, should probably delete and ini.Keyword is null -- only find missing entries order by p.Name 2 segments (bold above) require adjustment.

Error: Invalid RouteEdits: **Cannot find RouteID** by resourceKey/driverKey/orderKey	The route could not be found. Possible causes: Schedule must be of type Execution (3) Route has been moved to another schedule DriverKey has changed Check the <AuthServer> in the cXML response, verify it matches the SQL server expected (e.g. prod vs test).
Internal error: **timed out waiting for gcpi;**	The Descartes Route Planner DocBOL may fail with this error, this can happen for several reasons: Address caused problems with geocoder Usually caused by a problem with the map file, usually is 100% reproducible so manually re-posting should cause the failure to happen again. Perform an MD5 Checksum and compare to checksum on support server. It should be identical. Reproduce with GCPI debugging enabled and escalate to engineering and/or mapping team. GCPI queue is enabled (not recommended) Either no DCF$GCPI or LNOS$GCPI services are running, start service to resolve. Or; Permissions issue on the queue - see eventlog errors to investigate. Component became unhealthy Least likely cause, usually the whole transaction times out, not the GCPI component of it.
Order Task Error; Failed to save order **xxxxx. [reason]FATAL:** activity locationKey and type does not match existing data **;...**	The XML is trying to change what is being done for a given order through an update, e.g. swapping a pickup or delivery for double-ended or updating a delivery as a pickup or vice versa If the activity type needs to be changed (p/u or del) for a stop than the order needs to be deleted and re-sent.
Schedule is **Locked by Another Process**	See Schedule is Locked by Another Process for more details
LNOS Geocode.DocGeocodeTask.Resolve **"**Unable to send message**. Queue not open. Path=.\PRIVATE$\LNOSGEO_RES_Q1"**	Check that the queues are setup on servers. **App Setup > System Values** Set **UseQueueGCPI** to **0** On ALL SERVERS open LNOSSetup.exe (installer) and disable the GCPI queue, otherwise this setting will be reverted the next time an installer is run.

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| xxxxx.xxxxx.xxxx.xxx failed

"Unable to send message. Queue not open.

Path=.\PRIVATE$\lnosfw_yyyyy_Q1" | The queue **yyyy** does not exist but is enabled via sys value, this can happen for several reasons:

1. The queue was enabled on at least one server and is not enabled on the current server. If a queue is enabled on one server it must be enable don all servers with at least one service.
   1. **Resolution:** Disable queue on all servers or enable services on all servers
2. Queue is enabled however all services are stopped and queue has been deleted.
   1. **Resolution:** Start the appropriate service and ensure it is appropriately monitored per the hosting guide.
3. The queue was created by an account running under the wrong identity and has the wrong permissions/ownership.
   1. **Resolution:** Correct the identity on the problematic LNOS$/DCF$ services, delete the MSMQ queue (note: you may need to take ownership prior). |

Queue	Service Pattern
LNOSFW_Opt_Q1	LNOS$Optimize Svc # DCF$Optimize Svc #
LNOSFW_OptDisp_Q1	LNOS$OptDisp Svc # DCF$OptDisp Svc #
LNOSGEO_RES_Q1	LNOS$Geocode Svc # DCF$Geocode Svc #
LNOSFW_Advise_Q1	LNOS$Adapi Svc # DCF$Adapi Svc #
LNOSFW_Confirm_Q1	LNOS$Confirm Svc # DCF$Confirm Svc #
LNOSFW_OptUI_Q1	LNOS$OptUI Svc # DCF$OptUI Svc #

See FAQ Descartes Route Planner API Queuing for more details of what operations each queue is used for.

11 Security Investigation

Descartes Route Planner provides a set of standard roles. However, it is quite often necessary to create "custom roles" to truly meet the customers' needs. The best practice is to start with one of the core roles and then create a custom role that includes only those function groups (fngrps) which the user requires **in addition** to the core role. It is important to understand that there is no way to remove a fngrp that is granted by a role the user has.

Typically a dispatcher will start with either the **LNOSFW-ReadOnly** or **LNOSFW-Dispatcher** roles and then add addition functions that they want the user to have. When designing custom roles or assigning core roles to a user, there are a few common problems that can occur.

11.1 Missing LNOSFW-ReadOnly Role

In some deployments, the ReadOnly role is not visible from within the security UI (secadmin), however, it is present in the customer security database. The following query can be used to grant access to the security group to be able to see the role. This issue is an installer/deployment issue. Once fixed, the problem will not occur again.

The following query will add the role to the security user group. This query can be run multiple times and will only create the entry if missing.

11.1.1 Missing ReadOnly Role Fix
```
insert into CtyUserGrpRole (UserGrpID,RoleID,ModifiedBy,ModifyDate)
select ug.UserGrpID,r.RoleID,-1,GETDATE()
from CtyUserGrp ug
join CtyRole r on ug.UserGrpName like 'FW - Security Administration' and r.RoleName='lnosfw - readonly'
left join CtyUserGrpRole ugr on ug.UserGrpID=ugr.UserGrpID and r.RoleID = ugr.RoleID
where ugr.UserGrpRoleID is null
```

NOTE: When running this query on an activated installation **FW** needs to be updated to the **name** of the organization. e.g. **'Acme** - Security Administration'.

11.2 Common fngrp Core Role Issues

In various releases the core non-admin roles are either only partially functional or not functional at all. This issue usually occurs when a new readonly fngrp is added which is put in the -readonly and -admin roles but is not added to the -dispatcher or -planner roles. In this case, it is necessary to create a custom role that includes these missing fngrps and assign them to the User/Group in addition to the core role to ensure proper functioning of the application.

- **Data Filters>Options won't load**
  - Fleetwise - UICustomization_ReadOnly
  - Fleetwise Fleetwise - UICustUserProfile_Write
- **Edit Asset won't load**
  - FLeetwise-Cost Profile_ReadOnly
- **Data>Orders>Advanced won't load**
  - Fleetwise-Code
  - Fleetwise-FWSysValue_Readonly
- **Cannot edit resource**

- o   Fleetwise-Timezone-ReadOnly
- **Cannot edit location**
  - o   Fleetwise-Timezone-ReadOnly
- **13.1.x, dashboard will not load**
  - o   Fleetwise - Messages-Readonly
- **13.2.x, cannot edit Order or Resource**
  - o   Fleetwise - Party-Readonly
- **14.1.4.4, Re-Date Route**
  - o   Fleetwise – Schedule_Write (TFS 293355 created to change to FW_Route_w group)

11.3 Identifying Function Group for Operation

When attempting to add/remove a particular function for a user, the first step is identifying what fngrp needs to be added or removed. There are two main ways to achieve this.

By Command Function:

To determine the command function perform a UI trace of the operation. Identify each of the External Commands and run the following query to identify the fngrps required for each.

USE DCF

SELECT ModuleName,FunctionName, FnGrpCd, FnGrpName, FnGrpGuid
FROM   CtyFnGrp
 INNER JOIN CtyFnGrpFn
   ON CtyFnGrp.FnGrpID = CtyFnGrpFn.FnGrpID
 INNER JOIN DCFMenuItem
   ON DCFMenuItem.MenuItemID = CtyFnGrpFn.FnID

      WHERE ModuleName+'.'+FunctionName like '%.clearschedule'
      OR
      WHERE ModuleName+'.'+FunctionName like 'FWScheduleTask.clearschedule'
      OR
      WHERE ModuleName+'.'+FunctionName like '%.clear%'

By Navigation Plan:

The navigation plan determines what fngrps are necessary for a user to have to be able to see the menu item. These do not always match the values defined by the fngrp. This can be done by examining the file located at c:\inetpub\wwwroot\LNOSFWUI\NavigationPlan\NavigationPlan.xml. The NavPlan Role/Fn utilities can also be used to more quickly find what menu items the navplan associates to each UI operation. The file is reduced in size for easy review.

11.4 Determine Function Group (FnGrp) for Command

The function group for a particular action can be determined by the commands being performed also by the Navigation Plan. Some forms may require multiple Function Groups and they are not always obvious.

To determine the fngrp from the NavigationPlan, view the FnGrpCd attribute.

If the DCF Command is known, the associated fngrp can be looked up using the following query:

```
Select ModuleName, FunctionName, fngrpcd, ctyfngrp.fngrpname
from CtyFnGrp
inner join CtyFnGrpFn on CtyFnGrp.FnGrpID = CtyFnGrpFn.FnGrpID
inner join DCFMenuItem on DCFMenuItem.MenuItemID = CtyFnGrpFn.FnID
where FunctionName ='getoptlockstatus'
```

Here are some common FnGrp problems
Data Filters>Options won't load
- Fleetwise - UICustomization_ReadOnly
- Fleetwise Fleetwise - UICustUserProfile_Write
Edit Asset won't load
- FLeetwise-Cost Profile_ReadOnly
Data>Orders>Advanced won't load
- Fleetwise-Code
- Fleetwise-FWSysValue_Readonly
cannot edit location
- Fleetwise-Timezone-ReadOnly

11.4.1 NavPlan Role/Fn Analyzer

In the utilities/Security folder a tool can be found which can be used to parse the navigation plan either by providing a function group or a comparison role and it will provide an output containing the list of right-click menu items as well as form buttons that will be impacted by adding/removing the function group from a role.

11.4.2 Functions Roles Check

By running the following SQL query against the DCFSec database, a table is created with details on what function is assigned to what role. On the table in SQL manager, right-click on the table and use **Copy with Headers** to paste it into Excel.

```
============================================================
USE secAcme

declare @RoleFilter nvarchar(50)
declare @DCFDB nvarchar(32)
declare @FilterFnGrpByRole bit
set @DCFDB='DCF'
set @RoleFilter='LNOSFW%'
set @FilterFnGrpByRole =1

declare @LastRole int
select @LastRole=MAX(RoleID) from ctyrole where RoleName like @RoleFilter

declare @RoleCube nvarchar(max)
declare @RoleIDList nvarchar(max)
set @RoleCube='SELECT ctyfngrp.fngrpid,ctyfngrp.fngrpname,
ctyfngrp.fngrpguid,ctyfngrp.fngrpcd,'+CHAR(13)+CHAR(10)
```

```
select @RoleCube=@RoleCube+  ' max(case ctyrolefngrp.RoleID when
'+ltrim(str(roleid))+' then ''X'' else '''' END) ['+rolename+']' +case when
@LastRole=roleid then '' else ','   END +CHAR(13)+CHAR(10)
from ctyrole
where RoleName like @RoleFilter
order by roleid

set @RoleIDList=''
select @RoleIDList=@RoleIDList+  ltrim(str(roleid))+case when
@LastRole=roleid then '' else ','   END
from ctyrole
where RoleName like @RoleFilter
order by roleid

set @RoleCube=@RoleCube+ 'FROM '+@DCFDB+'.dbo.ctyfngrp ctyfngrp JOIN
ctyrolefngrp on ctyfngrp.fngrpid=ctyrolefngrp.fngrpid '+char(13)+char(10)
set @RoleCube=@RoleCube+ 'WHERE RoleID in ( '+@RoleIDList+')
'+char(13)+char(10)
set @RoleCube=@RoleCube+ 'GROUP BY
ctyfngrp.fngrpid,ctyfngrp.fngrpguid,ctyfngrp.fngrpname, ctyfngrp.fngrpcd
'+char(13)+char(10)
set @RoleCube=@RoleCube+ 'ORDER BY ctyfngrp.fngrpname'

print @RoleCube

exec sp_executesql @RoleCube
=================================================================
```

11.4.3 Role Group Check

Use the Command test to find out to what group a users is assigned to and what functions have been assigned. Browse to: http://localhost/STAD/Core/AdminTools/ and open the Command test. Fill in the Org, user and pass. Function is: login.login.login. Add the Org, user and pass details to the Input Command XML.

The response XML contains the group and the specific functions.

12 XML Scheduler Troubleshooting

See XML Scheduler Logs for an explanation of the logging format. There are several points of failure in the application.

Parsing Arguments
If this issue occurs no log will be created. For this reason, it is recommended whenever changing the configuration file or CMD files to first test them from a command prompt.

Configuration Validation
If key fields are missing an error will be logged indicating the field that is missing.
[BR: B99] Organization is missing from config item node, Exiting.
[BR: B99] Config item node <Branch Location="B99" TimeOffset="1" DST="1" Active="1" TimeZone="EST"/>

Transforming
The transform itself can fail:
[BR: B99] Prepare to transform
[BR: B99] Transform Failed (ERR#) ERR
[BR: B99] Finished transforming.

Or it can fail when assigning the output to the XML object for delivery:
BR: B99] Transform output assignment Failed (ERR#) ERR

Posting
Fails to connect to the listener
Fails to initiate the send
Fails to complete the send

12.1 Processing Error

HTTP error is returned
FAILURE: Call Time: 3sec - **HTTP Error Code: ###** on Attempt 1
Typical ### are:

- **404** – Page not found, listener or host is likely invalid
- **500** – Server error, listener likely crashed, check IIS logs for more details
- **503** – Server is out of capacity, either IIS is not releasing sessions or too much activity is being received.
- **12###**
  12029 - ERROR_INTERNET_CANNOT_CONNECT
  Unable to connect to server (VPN or internet connection problem).
  12007 – ERROR_INTERNET_NAME_NOT_RESOLVED
  This indicates a DNS typo or lookup problem.
   See http://msdn.microsoft.com/en-us/library/aa383770%28VS.85%29.aspx for a listing of other failure codes that could be returned.

  XML Failure in response
  FAILURE: Call Time: 3sec – **[RP Message]** on Attempt 1
  Response parse failure.

Error Completing response handling (ERR#) ERR

Wrong data is being acted upon (stuff moved or not moved incorrectly).
Identify affected branches.
Find branches with problem in config file, check timezone.

- 77580-pst
- 77680-pst
- 77684-pst

Identify affected data (routes, orders, etc).
Make note of the key field and any field involved in the criteria.

1. Check cmd file.
2. Confirm XSL filename and TMZ and log file filename.
3. Check timing of move, e.g. Scheduled - @ 4:30 AM EST.
4. Review log.
5. See when it actually executed for the branch, record the timestamp. Look for tasks running after midnight that were scheduled before. If delayed till after midnight, it may behave differently.
6. Check criteria manually.
7. Depending on complexity may need to run cmd/vbs with /dbug runtime parameter to generate a sample file.
8. Take criteria statement, execute SQL query manually replacing getdate() with timestamp it was executed (from the log) and replacing $location with the appropriate branch code.
9. Check to see if the desired data was selected/not selected.

For example:
Select * from fwroute where schedulekey='$location_planning' and (projecteddeparteddate < getdate())
Would become:
Select * from fwroute where schedulekey='77580_planning' and (projecteddeparteddate < '2014-04-04 04:30:43')
If the wrong data is selected compare the criteria to the value in the fields wanted.

13 BGO Not Optimizing

When BGO fails to route there can be numerous causes. This section will help isolate the root cause. The methodology to isolate the problem is as follows:

Confirm BGO is evaluating data slice via **App Setup > Filters > Groups**. Is there a service name beside the dataslice? This indicates it is currently being optimized.

When was it last evaluated?
- If last evaluated is empty – BGO cannot find the dataslice.
- Check scheduler.log for more details.
- If last evaluated is significantly in the past, service is not running or BGO cannot find the dataslice.
- Check scheduler.log for more details.
- If last evaluation is recent, check BGO history (right-click option) to see what happened the last time it was optimized.
- Proceed with step two.
- Confirm orders and routes are selected.
- **App Setup > Filters > Groups**.

Check selected routes column > 0 (should always be when there is work to do).
Check unassigned stops column > 0 (should be when there are unassigned stops on the dashboard).

If either are 0:
Verify on the dashboard that this makes sense based on the criteria
Otherwise, check the scheduler.log file.

NOTE: Customize the screen to see these columns. Confirm its assigning/finding improvements and accepting them via **App Setup> Filters > Groups**.

Check the current stats and BGO history.

NOTE: There is a UI bug preventing this from working correctly (12.x, 13.x). Either use the BGO History RPS report or query the fwdatasetgrouphist table directly through the database.

Check # assign >= 0 (if there are unassigned to process).
Check # intra usually occurs after assignment, in a completed dataslice should be >= # of routes with stops.
Check # inter, # batch >= 0 usually occurs after intra, slowest part of BGO.

If **all 4 are 0** and routes and orders were selected **or** the number is **very low** it could indicate a RMPI crash (see RMPI Debugging for details).

If the optimization attempts are > 0 then check the improvements found. This indicates BGO found a better solution than it started with, for a schedule with old data this is often 0, if new data it should be > 0.

Check **optimizer.log** for more details when improvements are not being found.

- If there are improvements found are they accepted?
- Check the Improvements Accepted column.
- If slightly lower than Improvements Found, this is normal because as data changes BGO may lose some improvements it found. If significantly lower it can indicate an issue.

Check **Optimizer.Log** for further details.

Check **Optimizer (RMPI) debug** for more avenues of investigation.

13.1 Understanding the Optimizer.log file

When using separate property files

com.descartes.escheduler.optimizer.job_attribute_value = "5000"

Using the "" around the value makes the BGO read this as an string value. Leading it to ignore 9999+. Remove the "" to change this to a integer and BGO will include profit higher than 9999.

The optimizer.log file is located in the e:\lnos\fleetwise\scheduler\[servicename]\logs folder, it is a rolling log typically configured with a 1mb limit and a 10 file limit.

The following describes some common problems you might find logged in the optimizer log file.

Unable to connect to scheduler
2014-03-13 13:18:51,986 INFO [OptimizerDriver   ] *** Starting Optimizer (Internal BGO version LNOS 8.0.0)
2014-03-13 13:18:51,986 INFO [OptimizerDriver   ] Java version is 1.7.0_25
2014-03-13 13:18:51,986 INFO [OptimizerDriver   ]
2014-03-13 13:18:51,986 INFO [OptimizerDriver   ] --- Beginning List of Basic Properties -------
2014-03-13 13:18:51,986 INFO [ESchedulerClient] creating HTTP client for URL
http://localhost:8083/escheduler/server
2014-03-13 13:18:55,559 ERROR [chedulerOptimizer] Exception - java.lang.RuntimeException: **Can't create client:** invocation target exception: java.net.ConnectException: **Connection refused**: connect

This error means it is unable to connect to the **scheduler** service. This can be a multi-factorial problem, the timing is an important deciding factor on how to investigate.

If it is immediately following the startup (in the example above), it usually indicates there is a serious problem with the scheduler and the service is most likely either not running or crashed on startup. Check the scheduler.log for errors.
- Check optimizer_service.stderr.txt for errors
- Verify local.properties has map files configured and the path to them is correct.
- Verify **e:\lnos\fleetwise\scheduler\bin** folder has the **lrmpi.dll and lextpather.dll** that matches the e:\lnos\bin folder.
- Verify e:\lnos\fleetwise\scheduler\lib folder has the escheduler.jar file

If it occurs during an optimization call than it is a good indication that RMPI may have crashed.

Typically the optimizer will try and restart the scheduler service. If it is occurring frequently need to investigate from a RMPI crash perspective.

No dataslice found
2014-03-13 20:34:12,954 INFO [OptimizerDriver   ] No data slice to optimize. Wait 1 minute and ask LNOS FW again.

This can happen for several reasons. It is best to check the scheduler.log for errors at the time of the error.

Understanding the optimizer_service.stderr.txt file
The stderr.txt file can be useful in identifying problems with the optimizer service not running or not starting up. Typically the file is empty.

NoClassDefFound Error
java.lang.NoClassDefFoundError: com/descartes/escheduler/optimizer/OptimizerService

This error occurs when core files associated with the BGO are missing. This issue has been known to, on rare occasions, occur in virtual machines after patching. The first files to check are e:\lnos\fleetwise\scheduler\lib
Here is an example of two servers, one returning the error:

bad server	good server
ant.jar	ant.jar
concurrent.jar	concurrent.jar
datamgr.jar	datamgr.jar
Descartescache.jar	Descartescache.jar
	Descartesio.jar
	Descartesutil.jar
	escheduler.jar
jgeo.jar	jgeo.jar
jsoc.jar	jsoc.jar
junit.jar	junit.jar
	log4j.jar
maptuit.jar	maptuit.jar
notify.jar	notify.jar
optional.jar	optional.jar
roadmap.jar	roadmap.jar
rsjdbc.jar	rsjdbc.jar
servlet.jar	servlet.jar
xalan.jar	xalan.jar
	xerces.jar
xml-apis.jar	xml-apis.jar
	xmlrpc.jar

13.2 Understanding the Scheduler.log

The scheduler.log file is located in the e:\lnos\fleetwise\scheduler\[servicename]\logs folder. The Scheduler.log is a rolling log typically configured with a one megabyte and 10 file limit.

Checking the "synch" time (when BGO attempts to get new work from Descartes Route Planner)
2013-11-25 15:38:40,956 INFO [teSynchronization] Updating from LNOSFW
2013-11-25 15:38:40,956 INFO [teSynchronization] Update from LNOSFW askForNewDataSet= true
2013-11-25 15:38:40,956 INFO [CFScheduleAdapter] Requesting
LNOSFWServerURL=http://Descartes_BGO/LNOSFWUI/Core/CtyXmlInterface/CtyInterfacesCCL.CtyXMLCC.asp
2013-11-25 15:38:40,956 INFO [CFScheduleAdapter] Requesting company - AcmeAreaKey=-NoAreas- Filter=
Command option 0
2013-11-25 15:38:41,487 WARN [CFScheduleAdapter] No DocSchedule returned from LNOS. Waiting 1 minute
before trying again
2013-11-25 15:39:41,503 INFO [EScheduler   ] Dropped elements
2013-11-25 15:39:41,503 INFO [ESchedulerServer R11] finished admin.synchronize: time=60547 msecs,
avg=60562

If very long, i.e. too much data, sql blocking, pathing is crashing, too many depots and recharging is enabled, typical
is 3-10 seconds (3000-10000).

Check the response.

Bad Response:
2013-11-25 15:38:40,956 INFO [teSynchronization] Updating from LNOSFW
2013-11-25 15:38:40,956 INFO [teSynchronization] Update from LNOSFW askForNewDataSet= true
2013-11-25 15:38:40,956 INFO [CFScheduleAdapter] Requesting
LNOSFWServerURL=http://Descartes_BGO/LNOSFWUI/Core/CtyXmlInterface/CtyInterfacesCCL.CtyXMLCC.asp
2013-11-25 15:38:40,956 INFO [CFScheduleAdapter] Requesting company - AreaKey=-NoAreas- Filter= Command
option 0
2013-11-25 15:38:41,487 WARN [CFScheduleAdapter] No DocSchedule returned from LNOS. Waiting 1 minute
before trying again
2013-11-25 15:39:41,503 INFO [EScheduler   ] Dropped elements
2013-11-25 15:39:41,503 INFO [ESchedulerServer R11] finished admin.synchronize: time=60547 msecs,
avg=60562

Good Response:
2013-11-25 19:53:47,560 INFO [teSynchronization] Updating from LNOSFW
2013-11-25 19:53:47,560 INFO [teSynchronization] Update from LNOSFW askForNewDataSet= true
2013-11-25 19:53:47,934 INFO [CFScheduleAdapter] Requesting
LNOSFWServerURL=http://PTMFWBGO01/LNOSFWUI/Core/CtyXmlInterface/CtyInterfacesCCL.CtyXMLCC.asp
2013-11-25 19:53:47,950 INFO [CFScheduleAdapter] Requesting company - Acme AreaKey=Pooling Filter=
Command option 0
2013-11-25 19:53:49,214 INFO [CFScheduleAdapter] LNOS version 13.1.3.9
2013-11-25 19:53:49,214 INFO [CFScheduleAdapter] DataSetGroupKey returned is Pooling1
2013-11-25 19:53:49,214 INFO [CFScheduleAdapter] Set orig zone file path =
2013-11-25 19:53:49,370 INFO [CFScheduleAdapter] LNOSFW response: Number of Snapshot Elements Returned:
151
2013-11-25 19:53:49,370 INFO [CFScheduleAdapter] LNOSFW response contains: Resources=4 Jobs=65
Customers=65 Depots=2 Routing Params=13
2013-11-25 19:53:49,417 INFO [EScheduler   ] Dropped elements

13.2.1 Common Responses

No DocSchedule returned

2013-11-25 15:38:41,487 WARN [CFScheduleAdapter] No DocSchedule returned from LNOS. Waiting 1 minute before trying again.

Usually caused by install problems: enable log_changes in local.properties, review XMLs in log\date+time\ and debug. Review GetScheduleResponse and confirm if the DataXML has a DocSchedule element. Check the BGO version, check the escheduler.jar date in the e:\lnos\fleetwise\scheduler\lib folder and make sure it seems "reasonable".
Ensure install was run with "load XML" with the Fleetwise component selected on at least one server, error when editing the UI was "function not defined". Try to restart DCF System to ensure no caching is occurring in component information (e.g. missing functions).

No DataSetGroupKey found

2013-11-25 20:59:34,514 INFO [CFScheduleAdapter] Requesting company - Acme AreaKey=-NoAreas- Filter= Command option 0
2013-11-25 20:57:23,481 WARN [CFScheduleAdapter] LNOSFW response: FAILED - Invalid Schedule Request: No DataSetGroupKey found.

Verify the local.properties orgname is correct.
Verify the local.properties areakey matches the dataslice(s).
Verify there are dataslices not currently being optimized. If there are more services than dataslices the servers without a dataslice will log this error.

DataSetGroupKey returned is xxxx shortly followed by Dropped Elements and "starting a servlet"

This usually signifies a crash in the optimizer. There is also usually a time gap between the dropped elements and starting a servlet.

2013-11-25 19:53:49,214 INFO [CFScheduleAdapter] LNOS version 13.1.3.9
2013-11-25 19:53:49,214 INFO [CFScheduleAdapter] DataSetGroupKey returned is Pooling1
2013-11-25 19:53:49,214 INFO [CFScheduleAdapter] Set orig zone file path =
2013-11-25 19:53:49,370 INFO [CFScheduleAdapter] LNOSFW response: Number of Snapshot Elements Returned: 151
2013-11-25 19:53:49,370 INFO [CFScheduleAdapter] LNOSFW response contains: Resources=4 Jobs=65 Customers=65 Depots=2 Routing Params=13
2013-11-25 19:53:49,417 INFO [EScheduler   ] Dropped elements
2013-11-25 20:04:58,172 INFO [ESchedulerServlet] Starting a Servlet with home=e:\lnos\fleetwise\scheduler area=PFG_04
2013-11-25 20:04:58,187 INFO [ESchedulerServer]
   STARTING SCHEDULER

The optimizer.log will probably have the following entry with a timestamp between dropped elements and starting a servlet:
2013-11-25 21:14:24,571 ERROR [chedulerOptimizer] Exception - java.lang.Exception: LNOS did not respond to a GetSchedule or ConfirmSchedule call in the time allowed.
2013-11-25 21:37:54,085 INFO [chedulerOptimizer] Scheduler service stop - exit value 2

This could happen if IIS is not responding. Try opening the core listener defined in the local.properties files to verify it is responding. The typical URL is http://localhost/LNOSFWUI/Core/CtyXmlInterface/CtyInterfacesCCL.CtyXMLCC.asp. If healthy, the listener should respond with **<Root>DCF HTTP Listener</Root>**. Otherwise the optimizer may be crashing on load, perform RMPI debugging.

Unclosed literal near ...
Usually caused by missing ONE quote around a schedulekey, date, etc. in the dataset value.

Invalid column name near ...
Usually caused by missing both quoates around a schedulekey, etc. in the dataset value or referencing a column not in the defined table in the dataset value.

Invalid argument near ...
Usually occurs when using DATE= with a fixed date, e.g. DATE= '2011-07'30 instead of DATE= 0.

Named Pipe Failure
Occurs when BGO is trying to refresh a route or commit a route change. Occurs when queuing is enabled and the DCF$Optimize or LNOS$Optimize services are not running. Occurs less commonly if the call takes more than 300 seconds for the optimizer to finish. This case is extremely rare for BGO servers.

2014-07-15 13:51:41,609 INFO [CFScheduleAdapter R18] Saving Route:2014-07-15__B54_MT03_5504-1
2014-07-15 13:51:41,609 INFO [CFScheduleAdapter R18] Save Route:2014-07-15__B54_MT03_5504-1 completed.
2014-07-15 13:51:41,609 INFO [CFScheduleAdapter R18] Some unassigned jobs have been assigned in this improvement.
2014-07-15 14:01:41,823 INFO [teSynchronization R18] Error returned from LNOSFW ConfirmSchedule. Resynching. Error message=FAILED - Named pipe failure: Pipe connect operation timed out

SUCCESS but no data is selected
Missing both single quotes around a date in YYYY-MM-DD format - it performs the math and 2011-07-30 = 1974 and will select orders/routes 1,974 days after 01/01/1900 or approx. 06/01/1905.

Unable to connect to IIS/FW UI
Can get stuck here:
2014-03-13 14:25:30,069 INFO [ESchedulerServer R1] calling admin.serverSupportsVersion
2014-03-13 14:25:30,069 INFO [ESchedulerServer R1] finished admin.serverSupportsVersion: time=0 msecs, avg=0
2014-03-13 14:25:30,084 INFO [ESchedulerServer R2] calling admin.serverSupportsVersion
2014-03-13 14:25:30,084 INFO [ESchedulerServer R2] finished admin.serverSupportsVersion: time=0 msecs, avg=0
2014-03-13 14:25:30,100 INFO [ESchedulerServer R3] calling admin.synchronize
2014-03-13 14:25:30,100 INFO [EScheduler   R3] In synchronize newDataSet = true
2014-03-13 14:25:30,100 INFO [teSynchronization] Updating from LNOSFW
2014-03-13 14:25:30,100 INFO [teSynchronization] Update from LNOSFW askForNewDataSet= true

IF the service fails to start or to remain running, it usually indicates there is a serious problem with the scheduler and the service is most likely either not running or crashed on startup. Check the scheduler.log for errors.

Check optimizer_service.stderr.txt for errors.
Verify local.properties has map files configured and the path to them is correct.
Verify e:\lnos\fleetwise\scheduler\bin folder has the lrmpi.dll and lextpather.dll that matches the e:\lnos\bin folder.
Verify e:\lnos\fleetwise\scheduler\lib folder has the escheduler.jar file.

Troubleshooting techniques:
Orders not assigning but are being attempted.
Verify maps are correctly configured.
Open e:\lnos\fleetwise\scheduler\[service]\
Edit local.properties.
Locate the **[maps]** section.
Verify the list matches those in the **e:\lnos\bin\rmpi.ini** file.

NOTE: In local.properties the forward slash (/) will be used instead of backslash (\).

Enable **getSuggestions** API in the **optimizer.properties** (requires a restart of the FW_Optimizer service).

NOTE: This should only be used for debugging as it is a slower API and is not always 100% accurate.

Add the following property to the file or set the value to "1" if it already exists:
com.descartes.escheduler.optimizer.assign_use_getSuggestion =1

NOTE: Add this propertynear the com.descartes.escheduler.optimizer.assign = # section

NOTE: Set to "0" when finished to disable the option.

NOTE: This setting is **not compatible with assign_location_order**. If using getSuggestion, this setting needs to either not exist, be commented out (#) or set to "0".

Once enabled the optimizer.log will include the profit calculated by the optimizer. It is not always an exact match but is close enough to determine why it may not be working. If no options are returned, disabling **Restrict To Viable** on the schedule may return more options; however, they are usually not good options. If this does not help, an analysis of the debugging files will be necessary, specifically by performing a setting-by-setting comparison of the schedule, resource and order (in sequence).

13.3 Isolating a BGO

There are three options:
- Disable the other services
- Create an areakey called DEBUG# in the DB
- Insert into fwarea (areakey) values ('DEBUG#')

NOTE: # is an instance to allow for several separate isolations.

Assign a BGO to DEBUG# using the area_key property in local.properties and restart the FW_Scheduler service. Navigate to **App Setup > Filters > Groups**, edit the dataslice and set areakey to DEBUG#.

14 Working with Descartes AltaMap

If working with Descartes AltaMap the P2P cache file on the Descartes Map Editor server can be invaluable in understanding the parameters used in calculating a path as well as the resulting metrics calculated.

Consider the following scenario:
There is an unassigned stop, suggest shows no options being returned or extremely high penalties.
When reviewing this stop there are no capacity/requirement violations and no obvious reasons for being unassigned as it is in close proximity to the route or other stops. When the order is forced on the route the later stops on the route change to missed window, upon further examination the drive time to the stop is unusually high. This is a classic example of the drive time issues we will be investigating.

14.1 Configuring Descartes Route Planner to Use Descartes AltaMap

See **How-To – Enable AltaMap Routing** document for details on how to do this.

14.2 Descartes AltaMap Incremental Migration

It is usually not possible to migrate to Descartes AltaMap pathing all at once, instead it will be done branch by branch. The following process outlines the framework on how to do this for the user interface because it is controlled by a single setting for the entire organization. BGO services can be individually migrated by configuring a subset using the steps outlined in the [[Enable Descartes AltaMap Routing]] articles.

1. Login as secadmin, create new organization with "GM" suffix and activate it.
2. Login as dsgdeveloper, create new organization with "GM" suffix and activate it.
3. Activate LNOSFW, ShipperTad, SecAdmin applications with CtySecurityCSL and matching "host" entry for the original org.
4. Edit host records for LNOSFW, SecAdmin, ShipperTAD, duplicate "Connections" but with "GM" suffix organization.
5. Update dcfhost with glnorgid for new org in both DCF and Sec databases.
6. Shutdown COM+ / services.
7. Login as secadmin, right click new "GM" org and choose user groups, create new group mirroring existing group.If the user's usergroup is utilized for any right, the entity will need to be updated with the new usergroup# (level3id) and org# (level1id).
8. Resecure the new usergroup
9. Run the following query to create the org-specific external pathing settings

   insert into ctysysvalue
   select (select max(sysvalueid) from ctysysvalue)+(rank() over (order by sysvalueid)),accountid=6,groupid,value,modifiedby,modifydate,keyword,keygroup
    from ctysysvalue where keyword like '%ext%'

   Through database edit these settings and configure appropriately; accountid=6 is the key to identifying them.
   5 = original org
   6 = new org
   0 = all orgs

10. Login as usradmin, update user to new usergroup.

To test, login as user but with "GM" suffix org instead. Monitor the pathing service log on GM server and verify pathing requests are received.

15 Driving Time or Path is Invalid

15.1 Step 1: Show Along the Road

Show along the road is a very useful tool to see why driving time does not make sense.

There are five possibilities that will occur:
- Customer geocode is not near a road.
  - If the customer is not near the road they will need to be re-geocoded so they are near a valid road.
- Path will look **normal/correct**
  - This usually indicates an incorrectly configured routing parameter (bad speeds) or improper road classifications (by map vendor) resulting in bad driving speeds (e.g. Alberta).
  - In some cases this can be addressed by using **speed factors** otherwise a **custom routing parameter** might be required for the branch/region affected.
  - Driving time/distance seems to be out of proportion to expectations.
    - In rare circumstances the application **does not correctly convert from MI to KM**, change to the metric unit of measure and see if the values are still incorrect.
      - If they are **correct**
        - Then it is a conversion issue.
      - If they are **not** correct
        - Use an external map application as a baseline.
        - Try multiplying or dividing the Descartes Route Planner numbers in increments of 1.61 to see if they then become similar, start with distance.
        - Keep in mind if distance is off then time will be out by the same proportion.
        - This issue can result in time being double converted wrong (KM*1.6)*1.6 as both the speed and distances are wrong.
- Path will go somewhere completely out of route (typically a state border).
  - This is typically occurs in **LMB** when 2 stops on the route are on different map files, LMB requires any two points being routed to be in a single map file.
  - This can also occur in Descartes AltaMap if an obvious path is not taken for some reason (e.g. toll roads, etc) see the remainder of the document for further details on how to investigate this. If issue is still not clear escalate to engineering.
- Path will show a **straight line** path going to AND from a stop.
  - A straight line path will not follow the roads and will be a line connecting the previous stop to the problem stop and a straight line going to the following stop.
- Path will show a straight line path going to OR from a stop
  - This is less common and usually occurs on the border of a commercially restricted area or if there are one-way roads involved in the path.
  - This is a variant of #3 and is investigated the same way.

- **NOTE:** In some versions the system does not always calculate the same path as the route itself. In that case, a careful examination of the stop-to-stop driving time and distances is required. For #3 typically straight line paths are significantly longer and shorter distance. For #2 there is usually a massive increase in the distance between stops.

- The rest of the instructions are to investigate scenarios #3 and #4.

15.2 Step 2: Use UI Calculate Distance to Find Problem Road Section Boundaries

Using calculate distance to find problem road section boundaries is a good way to test the various routing parameter options. This process works best with LMB pathing as Descartes AltaMap pathing has additional attributes that can influence the path that the calculate distance does not use.If a problem is already identified Skip to **Step 4.**

NOTE: It is important to understand the calculate distance always uses the DEFAULTS routing parameter so it is only effective when the resource does not have a custom parameter assigned to it or has no parameter assigned.

Routing Parameters

StartTime	EndTime	RouteparmsKey

StartTime

EndTime

RouteparmsKey   ...

NEW   DELETE

15.3 Step 3: Use an "ALLROADS" Routing Parameter to Isolate Routing Parameter Settings

Edit the existing routing parameter being used and review the Allow section properties (including those in the Exteral Pather section if using Descartes AltaMap).

Allow		External Pather Speed Category	
☐ NonCommercialRoadsOnly	☐ BusRoadsOnly	Allow U-Turns:	☑
☑ MilitaryRoadsOnly	☑ AllowPrivateRoads	Allow Toll Roads:	☑
☐ AllowVehicle	☐ AllowWalkways	Dist Cost:	18 /mile
☐ Allow Ferries		Hour Cost:	300 /hour

NOTE: In this example Commercial, Bus, Vehicle, Walkways and Ferries are all disabled. If all are allowed, proceed to **Step 5** to change the customer geocode. If some are not allowed, create a routing parameter (ALLROADS) if it does not already exist by cloning the current or DEFAULTS Routing parameter. Configure all Allow section properties to **Checked**.

Then assign the ALLROADS routing parameter to the affected resource with a start/end of 12am-11:59pm.

Save the resource and re-enable **Show Along the Road** on the **Map** quadrant. If the issue is resolved, isolate which road restriction is causing the problem. Once this is found there are 4 options:

- Permanently enable the road type (perhaps with a very high cost per mile, e.g. ferry, alley, etc.) in all routing parameters.
- Create a custom routing parameter for the region/route.
- Assign the ALLROADS routing parameter to the route when issues identified.
- Move the customer geocode to a routable location (see **Step 5** for details).

15.4 Step 4: Move Customer Geocode to "OK" Location

In most cases moving the customers geocode a few intersections/roads over will resolve the issue. Use the **accept alternate location** to have the new location be utilized.

Map data © 1987-2014 HERE

It may require several attempts to find a viable alternative location, once adjusted the lat/long should be **locked** so that future orders for this customer will be routed.
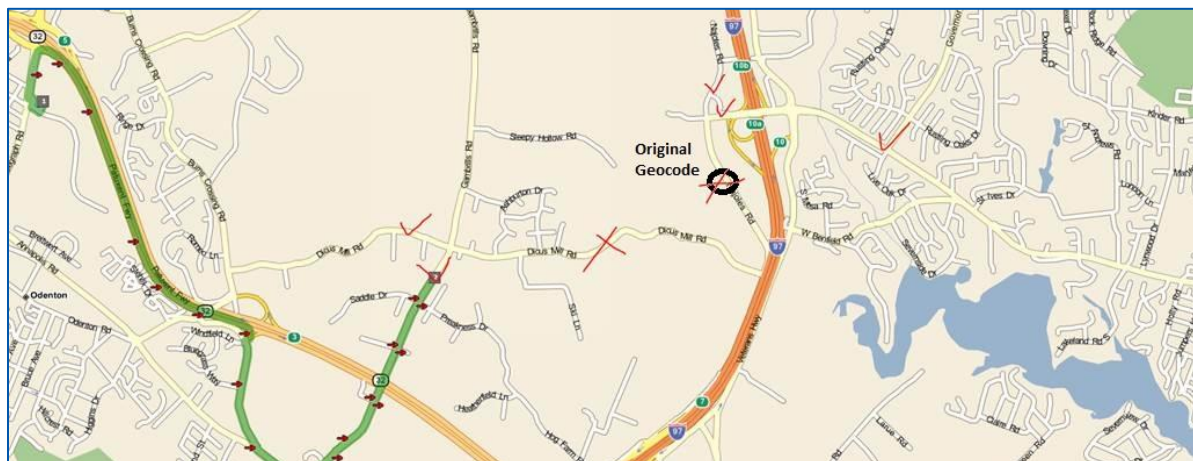
Map data © 1987-2014 HERE

15.5 Step 5: Verify Map data is being utilized

If **LMB maps** are being used, verify that the maps are correctly defined in the rmpi*.ini and BGO local.properties files:

[Maps]
File1=e:\maps\n7us.lmb;200000;1;1;1;1
File2=e:\maps\n7canv.lmb;200000;1;1;1;1

Otherwise, if using an external pather (e.g. Descartes AltaMap), use the following steps to investigate:
1. Check IIS logs on map server. If small (< 1mb in production or 0kb in test) probably not in use.
    - Check the logs to see if "real" requests are coming from the server in question.
2. Check inetpub\wwwroot\mapeditor\logs, review service.log if small < 5 mb, probably not in use.
3. Login to Descartes Route Planner.
4. Go to **App Setup > System Values**.
    - Search for "external"
    - Verify **UseExternalRoadRouter** is set to **3**
    - Copy the URL in **ExternalRoadRouter**, verify loads in browser **from the server**.

Application Configuration / Sys Value	
Sys Value	
Keyword	Value
UseExternalRoadRouter	1
ExternalRoadRouter	http://10.32.34.147/mapeditor/lnospathingservice.aspx

    - If **not** – fix url/webservice
5. If possible – isolate server by removing from load balancer to avoid excessive debug logging
6. Open regedit and enable RMPI debug.
    - Open **HKLM\Software\[Wow6432node\]Descartes\LNOS Fleetwise**
    - Double click DumpRmpiDebugInfo and set to 6 (reset to 0 when finished)
7. Clear existing debug files.
    - [drive]:\lnos\fleetwise
    - Delete all debug*.txt
8. Open Descartes Route Planner and initiate optimizer.
    - Go to dashboard, perform any optimization function e.g. suggest, resequence, etc
9. Review debug file.
    - Open [drive]:\lnos\fleetwise
    - Open RmpiDeubg_rmpi_####.txt
    - Look for using external road router
            Farther in the file should see
    - Look for Data: Navteq with Truck
            If this is not seen – indicates no data found.
            Data: Navteq with Truck
            Nav Releaseed on 2014-01-27
            Map Edit Time: 2014-04-27T07:32:00

Initialized External router with
ExtPathingServer=http://server/mapeditor/lnospathingservice.aspx
NOTE: **map edit time** and **Map released on** dates.

- Look for initialized external router with ExtPathingServer=xxxx
    If this is not seen could indicate a failure during connection.
- Look for OriginalDistanceCacheFile property is not set
    This means rmpi.ini was not correctly configured – see **How To - Enable GeoMicro routing.docx**
- Check IIS and MapEditor logs on map server
    If no request appears – it could be using cached paths

10. Navigate to drive:\lnos\fleetwise\cache.
11. Delete all files in this directory and all sub-directories.
12. Use RestartCOM to stop all services and start all services again.
13. Resequence the same route.
14. Repeat steps above if the requests appear to be working.

15.6 Step 6: External Pather Attributes Testing (Descartes AltaMap)

If the UI Calculate distance does not find a problem, the problem is likely related to additional external pathing attributes. The external pather can apply road restrictions that affect only certain routes based on the attributes of the resource. Either one by one or as a whole these need to be disabled to identify if they are related to the problem occurring. The existing values should be noted prior to adjusting.

These attributes are:

Work Units:		
Empty Weight		
Height:	12.50	ft
Length	40.00	ft
Width:	8.50	ft

Weight
This is controlled by the Empty Weight resource setting and the Schedule level Measure to weight conversion settings. To test this, set the resource Empty Weight to 0.

NOTE: If assets are assigned they may need to be unassigned or the **Ignore Asset Measures** checkbox needs to be enabled as assets can provide an empty weight. Set the schedule Measure to Weight factor to 0.

Length/Height/Width

This is controlled by the **Length/Height/Width resource** setting. To test this, set the resource Length/Height/Width to 0.

NOTE: If assets are assigned, they may need to be unassigned or the **Ignore Asset Measures** checkbox needs to be enabled as assets can provide an empty weight.

Hazmat

This is controlled by the Hazmat resource setting. To test this, set the resource Hazardous Materials value to empty in the dropdown.

Commercial Truck

This is controlled by the Route As Commercial Truck resource AND schedule setting. To test this, set the resource Commercial Truck to unchecked. This setting can be difficult to distinguish from null. Do one of the following: Select the checkox and save and then deselect and save the page again, or set the Commercial Truck setting in the database directly.

If removal of these restrictions resolves the problems, isolate which is the problem. If incorrect the customer will need to be re-geocoded (see **Step 5** for details). Incorrect road classification needs to be reported to the map vendor. Otherwise, proceed to **Step 4**.

15.7 Drive Time or Path Invalid

During or after implementation issues can be encountered where the drive time appears to be wrong. This issue returns extremely long drive times and in some cases when performing a **Show Along the Road** function, the system will display a straight line drawn from a stop to its preceding or following stops. In some cases, a path may diverge significantly. This section evaluates these problems and how to identify the root cause.

Ensure Routing Parameters Correctly Configured

If the routing parameters have been adjusted from their defaults and the speeds do not appear to match the new routing parameters, make sure the routing parameters are assigned to the route for the driving period or the routing parameter is named DEFAULTS (upper case). If the routing parameters still do not appear to be used, make sure they have been enabled on the **System Values** page.

16 Optimizer (RMPI) Debug

The optimizer is invoked any time an order is assigned to a route or an order is updated that is already assigned to a route, this is in addition to the obvious cases when a user asks the system to make a decision. The BGO also uses the optimizer to perform automatic route building.

To debug problems involving the optimizer the RMPI debug may need to be enabled.

16.1 UI and Service Configuration

Descartes Route Planner has several types of debug files for RMPI optimization and each file has one or more ways to be enabled. The configuration for BGO is different from the DCF$/LNOS$ services and DCF COM+ application.

- **LNOS/Descartes Route Planner RMPI Debug** (usually called RmpiDebug.txt)
    - o **Registry (Preferred)**
        - ▪ Open HKLM\Software\[Wow6432Node\]\Descartes\LNOS Fleetwise
        - ▪ Edit DumpRmpiDebugInfo registry string (REG_SZ)
        - ▪ Set to "6" to enable or "0" to disable
        - ▪ **Note:** If Sys Value setting is > 0 it will override this setting
    - o **Sys Value (Legacy)**
        - ▪ **UI**
            - ▪ Login as an "admin" (e.g. fw-admin)
            - ▪ Navigate to **App Setup > System Values**
            - ▪ Search for "DumpRmpiDebugInfo"
            - ▪ Change value to "6" to enable or "0" to disable
        - ▪ **SQL**
            - ▪ Open LNOSFW_XXX or FWXXX database
            - ▪ Run the following query:
            - ▪ Update CtySysValue set Value=# where keyword='DumpRmpiDebugInfo'
            - ▪ Change # to "6" to enable or "0" to disable
        - ▪ Perform Restart DCF System using RestartCOM utility on each server where debugging is desired or needs to be disabled
    - o **BGO**
        - ▪ Edit local.properties
        - ▪ Set Debug.File = debug.txt
        - ▪ Set Optimization.WriteDebugOutput = 1
        - ▪ Set Optimization.OptSummaryFile = optlog.txt
        - ▪ **Note:** set files back to **nul** to disable, there is only 1 L in nul
        - ▪ Stop optimizer, restart scheduler, start optimizer
        - ▪ Once the optimization to debug has occurred (watch the optimizer.log), stop the optimizer service and disable it
        - ▪ Use a highlighting rule in baretail with a purple background color to quickly identify the record in question
        - ▪ Debug file can be found in temp subfolder
        - ▪ **Note:** the debug file and all other files are deleted from the temp subfolder on each restart of the FW_Scheduler service. To preserve them the debug files can be written to a subfolder e.g. log/debug.txt (which must be manually created)

- **RMPI Debug File** (usually called RmpiDebug_rmpi.txt or debug.txt)
  - o **Registry (Preferred)**
    - ▪ Open HKLM\Software\[Wow6432Node\]\Descartes\LNOS Fleetwise
    - ▪ Edit DumpRmpiDebugInfo registry string (REG_SZ)
    - ▪ Set to "6" to enable or "0" to disable
    - ▪ **Note:** If Sys Value setting is > 0 it will override this setting
    - ▪ **Note:** No restart of services is required
  - o **Sys Value (legacy)**
    - ▪ **INI**
      - ▪ Edit the appropriate bin*[INIs\orgname\]*\rmpi_xxxx.ini file(s)
      - ▪ Set WriteDebugOutput (1 = on, 0 = off)
      - ▪ Search for [Debug] section
      - ▪ Set File=yyyy (full path and filename to where the debug file should be written)
    - ▪ Restart service associated with INI file(s) edited
    - ▪ Or; Perform Restart DCF System using RestartCOM utility on each server where debugging is desired or needs to be disabled
- **Optimization Summary File** (usually called OptLog.txt)
  - o **Registry (Preferred)**
    - ▪ Open HKLM\Software\[Wow6432Node\]\Descartes\LNOS Fleetwise
    - ▪ Edit DumpRmpiDebugInfo registry string (REG_SZ)
    - ▪ Set to "6" to enable or "0" to disable
    - ▪ **Note:** If Sys Value setting is > 0 it will override this setting
    - ▪ **Note:** No restart of services is required.
  - o **Sys Value (legacy)**
    - ▪ **INI**
      - ▪ Edit the appropriate bin*[INIs\orgname\]*\rmpi_xxxx.ini file(s)
      - ▪ Set OptSummaryFile=yyy (full path and filename to where the debug file should be written)
    - ▪ Restart service associated with INI file(s) edited
    - ▪ Or; Perform Restart DCF System using RestartCOM utility on each server where debugging is desired or needs to be disabled

16.2 BGO Setting

The registry setting does not trigger BGO logging, instead you will need to modify the bgo configuration files.

1. Edit local.properties
2. Set Debug.File = debug.txt
3. Set Optimization.WriteDebugOutput = 1
4. Set Optimization.OptSummaryFile = optlog.txt

NOTE: Set files back to **nul** to disable (single "L" in nul).

Stop optimizer, restart scheduler and start optimizer. Once the optimization to debug has occurred (watch the optimizer.log), stop the optimizer service and disable it.

Use a highlighting rule in baretail with a purple background color to quickly identify the record in question (order/route). Debug file can be found in temp subfolder.

NOTE: the debug file and all other files are deleted from the temp subfolder on each restart of the FW_Scheduler service.

16.2.1 BGO and UI Behave Differently

1. Compare BGO optlog.txt to UI RmpiDebug_OptSummary file
2. [Router] == [Routing] in the INI
3. Compare settings, identify likely candidates and normalize them to isolate problem setting

1. Compare BGO debug.txt to UI RmpiDebug_rmpi file
2. Start with UI (Working)
3. Find order and route desired (work from bottom up)

Review the BGO debug.txt. Does it include the desired route? If it does not, determine if the route was available to the BGO. If it is, evaluate the log to determine why it did not return a suggestion.

For example:
order *2114468*
resource *93750*

debug.txt excerpt shows the order is deemed not able to be serviced:

```
The equivalent resource map:
RT-93750-20131129 RT-93750-20131129 *
SIERPINSKI Value = 2
SierpinskiMaxValue = 2, tourLength = 82148
SIERPINSKI Value = 1024
SierpinskiMaxValue = 1024, tourLength = 82148
SIERPINSKI Value = 768
SierpinskiMaxValue = 768, tourLength = 82148
SIERPINSKI Value = 512
SierpinskiMaxValue = 512, tourLength = 82148
SIERPINSKI Value = 256
SierpinskiMaxValue = 256, tourLength = 82148
SIERPINSKI Value = 1536
SierpinskiMaxValue = 1536, tourLength = 82148
Problem has:
2 delivery only jobs
0 pickup only jobs
0 double ended jobs
0 multi-task jobs
0 recharge jobs
0 redispatch jobs
0 number of depots
Finished initializing optimizer: 2 selected Jobs, 1 selected  Resources
Optimization using these routes:
Route RT-93750-20131129 has Total Profit = 1957.1:
 #1  Order-014-1520060-001-001-001-001-00001 / Delivery
Optimization using these unassigned jobs:
Order-009-2114468-001-001-007-001-00001
 MWR Reserving 9 matrixes (1,3,3,1)
Specialized processing for the resources is enabled.
Running Suggestion ('Zonable' Only)
The following jobs are unserviceable:
```

```
Order-009-2114468-001-001-007-001-00001
End of list (for unservicable jobs).
Profit == 1957.1
```

If all schedule settings are the same need to compare the resource level:
1. UI: RmpiDebug_###.txt
2. Search for the resource in question

As an example:

```
Resource
WGS-93750-20131129
AllowRecharges: 1
Capabilities: 93750 SVCWHT CDC
DynamicZoning: 0
DynamicZoningDistance: 20000
EarliestEnd: 11/29/2013 06:30:00
EarliestStart: 11/29/2013 06:30:00
EndVehicleMeasuresRequired:
FinalStationID: WGS-93750
Height: 0
InitialStationID: WGS-93750
LastDateWorked: 01/01/1901
LatestEnd: 11/29/2013 19:00:00
LatestStart: 11/29/2013 19:00:00
Length: 0
Measure1Amount: 999
Measure2Amount: 0
Measure3Amount: 0
Measure4Amount: 0
Measure5Amount: 0
Measure6Amount: 0
Measure7Amount: 0
Measure8Amount: 0
Measure9Amount: 0
ProjectedElapsedTime: 9467
ProjectedOnBoard1: 999
ProjectedStatus: 0
WeeklyRestLength: 00:00
Weight: 0
Width: 0
WorkDayDuration1: 08:00
WorkDayDuration2: 10:00
WorkWeekHistory1: 00:00
WorkWeekHistory10: 00:00
WorkWeekHistory11: 00:00
WorkWeekHistory12: 00:00
WorkWeekHistory13: 00:00
WorkWeekHistory14: 00:00
WorkWeekHistory2: 00:00
WorkWeekHistory3: 00:00
WorkWeekHistory4: 00:00
WorkWeekHistory5: 00:00
WorkWeekHistory6: 00:00
WorkWeekHistory7: 00:00
WorkWeekHistory8: 00:00
```

```
        WorkWeekHistory9: 00:00
        WorkWeekLength: 0
        WorkWeekLimit: 00:00
        WorkWeekResetTime: 00:00
        Zone: SOUTHERN_SUFFOLK_COU
```

To get it from BGO, use the **ant snapshot** utility:
1. Open a command prompt
2. Navigate to e:\lnos\fleetwise\scheduler
3. Ant snapshot -Durl=[work_url] >xxx.log
4. Where:
    a. xxx.log is where the results will be written
    b. The [work_url] can be retrieved from the optimizer.properties file. e.g.
       http://localhost:8083/escheduler/server

This process will dump what is currently in memory it is very important the scheduler service is till running from the time the optimizer performed the optimization.

Scan the file for <Resource to find the resource then the resource key.

For example:

```
<Resource Measure9Amount="0" WorkWeekHistory8="00:00:00" Height="0"
WorkDayDuration2="10:00:00" LastReportedLatitude="" WorkWeekHistory9="00:00:00"
ScheduleID="19" Width="0" WeeklyRestLength="00:00:00" Measure4Amount="0" serial="8"
WorkWeekHistory13="00:00:00" FinalStationID="WGS-93750" LastDateWorked="Tue Jan 01 00:00:00
EST 1901" FinalStopID="160161" EarliestStart="Fri Nov 29 06:30:00 EST 2013"
Measure6Amount="0" WorkWeekHistory7="00:00:00" WorkWeekHistory14="00:00:00"
DynamicZoning="1" Length="0" Zone="SOUTHERN_SUFFOLK_COU" LatestStart="Fri Nov 29 19:00:00
EST 2013" __hasStaticRecharge="0" ModifyCount="4" WorkWeekHistory4="00:00:00"
WorkWeekHistory1="00:00:00" InitialStopID="160160" WorkWeekHistory10="00:00:00"
EarliestEnd="Fri Nov 29 06:30:00 EST 2013" ScheduleKey="011WHT_BGO" LatestEnd="Fri Nov 29
19:00:00 EST 2013" InitialStationID="WGS-93750" WorkWeekHistory6="00:00:00" name="WGS-
93750-20131129" WorkWeekHistory5="00:00:00" RouteID="18993" WorkWeekHistory12="00:00:00"
WorkWeekLimit="00:00:00" Capabilities="93750 SVCWHT CDC" __hasStaticRedispatch="0"
Measure7Amount="0" Measure5Amount="0" Measure2Amount="0" CommercialTruck="0"
WorkWeekHistory3="00:00:00" WorkWeekResetTime="00:00:00" WorkWeekHistory2="00:00:00"
LastReportedDate="" Weight="0" WorkDayDuration1="08:00:00" Measure8Amount="0"
DynamicZoningDistance="20000" Measure3Amount="0" WorkWeekHistory11="00:00:00"
WorkWeekLength="0" ResourceKey="WGS-93750-20131129" Measure1Amount="999" ResourceID="22073"
LastReportedLongitude="" AllowRecharges="1"/>
```

If there is a resource that is working and one that is not one important step is to do a field by field comparison you can use the following query to compare two resources:

```
select * from fwresource where resourcekey in ('xxx','yyy') and going field by field
looking for differences
```

16.3 NO Suggestions

The **Suggest** function is designed to show a list of potential assignments and the associated projected profit for each. In some instances the suggest does not return any assignments.

Why did I not get a suggest?

- When performing a suggest in the UI, Descartes Route Planner selects a set of potentially compatible routes to pass to the optimizer. This is based on a limited set of criteria (Dates, Territory).
- If there are no such routes found the response will be "no suggestions".
- Once passed to the optimizer, it is still possible the optimizer will not find a match due to other incompatibilities. It will return the same message "no suggestions".
- To identify why they are not compatible, investigate the items that determine compatibility.
  - Verify the dates of the order overlap the expected routes by at least one day.
  - Verify the territory of the order matches the territory on the resource or the resource territory is a * or the resource has no territory
    - If both the order and the resource have no territory verify "restrict to zoneable" is **not** turned on and verify "ignore territories" is **turned on**.
    - Older version bugs preventing a match include:
      - Case mismatch in the Territory
  - Check if Dynamic Zoning is enabled (Schedule or Resource). If enabled, try turning this setting off.
  - Check if Max Distance from Depot is enabled (Schedule or Resource or Depot). If enabled try turning this setting off.
  - Compare the requirements of the order to the capabilities of the resource. Look for things like a missing "s" at the end or a missing character in the middle.
    - Older version bugs preventing a match include:
      - Case mismatch in the requirement
      - Extra spaces between requirements

16.4 Missed Time Windows

Why is my window missed?

- Check the Projected Begun field. This is the field used for determining ontime, not projected arrived.
- Double check the date of the order and route
- If the begun is BEFORE the window that will also trigger a violation.
  - Check to ensure resource has a Latest Start Date and Earliest End Date that allows it to occur within the window.
  - Check Schedule.MaxWindowWait. If route has to wait more than this limit it will service early and trigger a violation.
  - If okay, check the Projected Completed. If this value is outside the window check Schedule.HardWindows if 1 then the problem is the task did not COMPLETE within the window.
- If all this is okay, edit the order.
  - Check profit > 0 if profit is 0 there is no penalty for ignoring the window.
  - Check the window frequency
    - Make sure Other: does not have a "0" value
    - Try enabling all the days of the week. The window used is the **intersection** of the dates provided and the frequency.
    - Make sure there is not both an open/close and earliest/latest.
      - Open/Close will override any values provided in earliest/latest fields.

- Check that **Schedule > Use Time Windows** is appropriately configured (usually 0 - order only, or 3 - dates from order, times from location).
    - If use time windows = 3.
        - Make sure the UseDateRange is enabled in the order.
        - Make sure the location has a window for the day of week coinciding with the order date(s).

16.5 Odd RMPI Optimization Behaviors

This section is intended to capture odd behaviors that can sometimes occur depending on a single setting incorrectly used or a combination of settings/data/configuration.

Merges dramatically slows down optimization

Symptom:
If merges is configured too high, it can vastly slow down optimization two to three sec versus two to three minutes at the most.

Root Cause:
If the merge threshold is too high, RMPI will attempt to merge two routes that are not feasible and then will spend time trying to resequence the routes to optimize. As long as RMPI keeps finding improvements it could spend a nearly unlimited amount of time trying to solve this problem.

Solution:
Turn off merges.
Best practice:
Do not use merges unless absolutely necessary.

High infeasible penalty causes strange results and does not resequence properly

Symptom:
In some cases, when performing an optimize, it appears to ignore what appears to be obvious fixes to routes when a route has an infeasible stop; particularly when resequencing, it just seems to "give up".

Root Cause:
Unknown, occurs when infeasible penalty is one million with certain data sets.

Solution:
Use an infeasible penalty no higher than 100,000.
Best Practice:
Always configure infeasible penalty to 100,000.

Optimize All produces solution with vastly negative profit, much more than minimum_assignment penalty should allow

Symptom:
When running an optimize all the result can be very highly negative (in the millions).

Root cause:
This occurs because RMPI is ignoring certain constraints during various stages of optimization depending on certain optimization parameters.

Auto Assign Close orders (incorrectly labelled Auto Assign Orders in the UI) does not consider dates, requirements and capacity.

Use > Clusters does not consider requirements or capacity during seeding phase. Seeding does respect the requirements but the cluster it builds around the seed may not.

Best Practice:
Never use Auto Assign (Close) Orders
Only use Clusters for solutions without significant number of double ended orders, only a few orders have requirements.

RMPI creates a violation rather then rest/wait

Symptom:
When an order is forced on a multi-day route, the order is missed rather than taking a rest some time shortly before. When an order is forced on a single-day route, the order is missed and serviced early.

Root Cause:
Schedule > Missed Window Wait is an absolute setting. RMPI will never consider waiting beyond the set limit. Instead, RMPI will always service the order immediately upon arrival. With multi-day routes this is even more of a problem as it will never trigger early resting thresholds because it does not consider the wait.

Best Practice:
Use Wait Time Penalty to discourage excessive waiting. For multi-day routing, set MaxWindowWait between 24 hours and 24 hours *# of days of longest route. For single-day routing, set Max Window Wait to 4-14 hours, if using tight time windows and a small window wait it will force the optimizer to assign the order to a different route rather than the existing route that is in the area.

This is even bigger issue for reservations where a 7am to 8am order may come in first followed by a 3pm to 4pm order. If the max window wait is too small, it will not keep the route in the area.

16.6 Capacity Violations

- A stop is considered to be in violation if **any onboard measure** is over the capacity of the truck.
- When a capacity violation is detected **all measures** are flagged as red however onboard measures are not.

Why is my stop showing a capacity violation?

- A stop is considered to be in violation if **any onboard measure** is over the capacity of the truck.
- When a capacity violation is detected, **all measures** are flagged as red however onboard measures are not.
    - o Depending on which columns a user has displayed, this issue can cause confusion as the violation might be in Measure3 but they only show Measure1 at the route level so assume it is a measure1 capacity violation.
- To determine the cause of the violation, add the "onboard measure#" field **for all measures** in use at the stop level.
    - o Can be found under **Data>Schedules>Number of Measures** setting
- Then add the Measure# field for all measures in use at the resource level.
- Review the **Stop.onboardMeasure#** against the **Resource.Measure#** value to determine which measure was violated.

Why is my stop NOT showing a capacity violation?

- Verify the correct number of measures is enabled by navigating to **Data > Schedules > Number** of measures.
- To determine the cause of the lack of violation add the Onboard Measure# field **for all measures** in use at the stop level
    - Can be found under the **Data > Schedules > Number of Measures** setting
- Then add the Measure# field for all measures in use at the resource level.
- Review the **Stop.onboardMeasure#** against the **Resource.Measure#** value to determine which measure was expected to be violated.

17 Running RestartCOM as Admin (Windows® 2008 or higher)

User Access Control (UAC) was introduced with Windows® 2008. This requires elevated privileges to use the RestartCOM utility. The problem is the utility will still run, it can stop services however it does not have the permission to start the services it has stopped.

To configure RestartCOM to always run as an administrator:
1. Right click the RestartCOM executable (or a shortcut) and choose **Properties**.
2. Select the **Compatability** tab.
3. Click **Change settings for all users**.
4. Select **Run this program as an Administrator**.
5. Click **OK** and **OK** again.
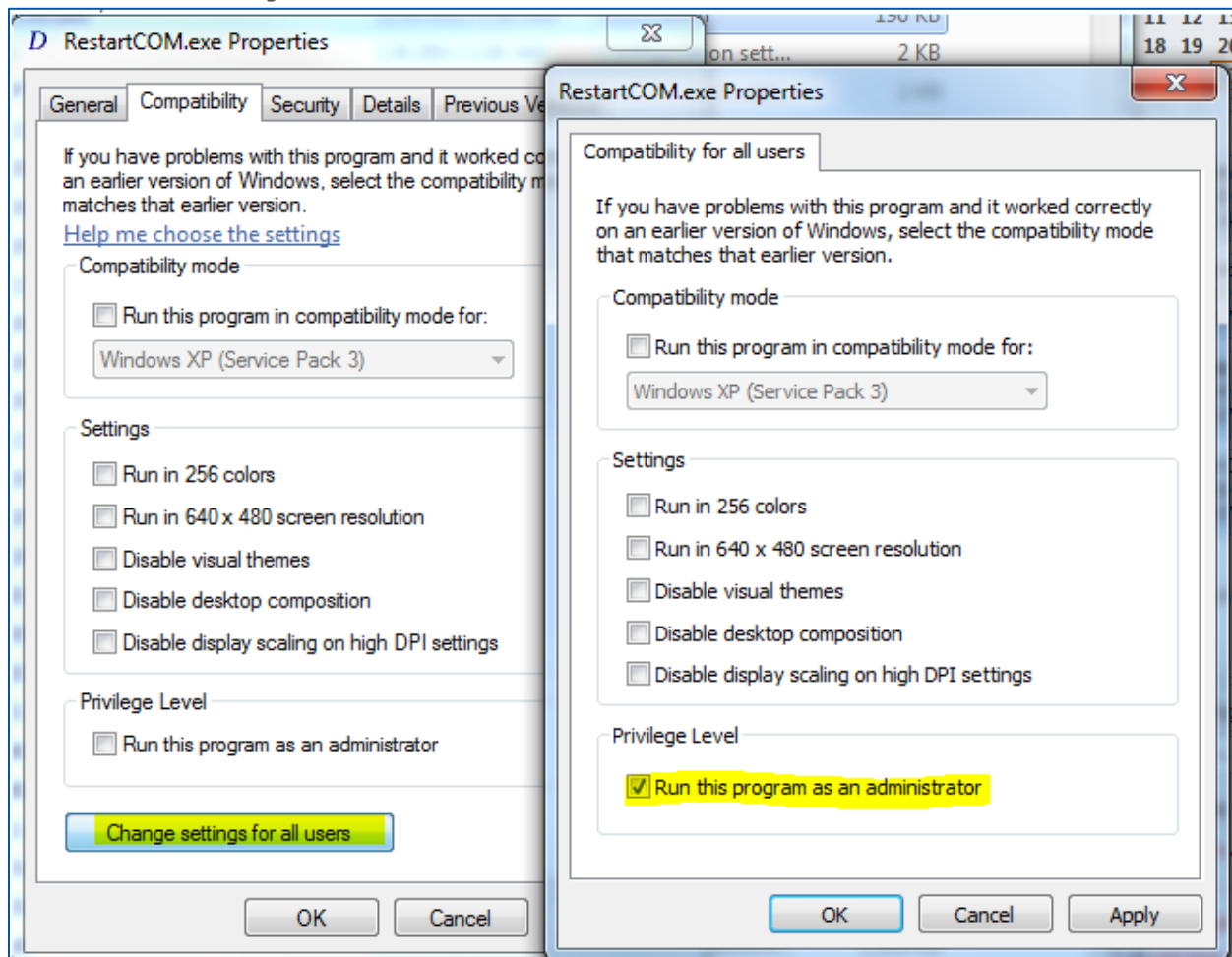
In the Task Scheduler each task must be setup to run with elevated privileges:
1. Open Administrative **Tools > Task Scheduler**.
2. Right-click each RestartCOM task and choose **Properties**.
3. Select **Run with highest privileges**.

NOTE: Test DCF Backend job must be disabled on Windows® 2008 servers. If it is not it will crash and over time will leave an excessive number of running RestartCOM processes that will crash the server.

18 Server Performance

18.1 Out of Memory or Low Memory

When a server runs out of memory the application requests may fail. The symptoms can be varied and it is not always easy to isolate which problems are memory related and which ones are not.

There are two main types of memory related problems:

1. A single process uses too much memory
2. The entire server runs out of memory

The resolution and investigation will vary depending on which problem is occurring. The first thing is to understand the various types of memory used by a server or process.

Server Level

- **Available Memory** - This is the amount of memory currently available to the operating system for new allocations.
- **Total Memory** - This is the total amount of physical memory available to the operating system.
- **Non-Paged Pool** - This is memory that is in use which cannot be saved to the page file, this must remain in active memory and is primarily used by drivers and (usually) in small amounts by processes. Usually if growing it is due to a driver bug.

Process Level

- **Working Set** - This is the memory being actively used by the process.
- **Private Bytes** - This is memory the process needs but is not being actively used.
- **Commit Size** - This is memory that has been allocated to a process but is not necessarily used.
- **Virtual Bytes** - This is the memory that has been requested by a process even if never used (usually memory leaks are visible by a large discrepancy between this value and the Working Set + Private Bytes).
  - **Note:** This value can only be retrieved using performance counters!
- **Non-paged pool** - This is memory that cannot be saved to the page file and must remain in active memory.

Low Server Memory

Symptoms

- Random request failures
- Processes unable to start
- Resource Exhaustion Detector errors in eventlog (usually 1003 or 2004)

Investigation

- Use the **High Process Memory** investigation process.
  - If the top 10 processes do not account for the amount of memory usage it could indicate a problem with non-paged pool.

- To determine the **non-paged pool** memory go to the main tab (2008 and lower), the Summary tab (2012) or use the following powershell command:
  - gwmi *-cn server1,server2,server3* -class win32_perfrawdata_perfOS_Memory | select PSComputerName,PoolNonPagedBytes,AvailableMBytes
  - **Note:** *-cn server1,server2,server3* can be omitted if retrieving for localhost
- Non-paged pool can be consumed by a single process (visible per process in Task Manager) or by a core driver, if consumed by a core driver the only solution is to reboot and investigate/isolate which driver is the problem.
- If this is a recurring problem it is recommended to create a perfmon collection that collects the OS and process memory utilization on a reasonably high interval (10-30 seconds) and collect this data for several days and look for trends. If there is a massive (sudden) jump this usually indicates a specific trigger, a gradual increase is more indicative of a leak.
- **RAMMAP** is a useful tool to help investigate the breakdown of memory utilization.
  - https://technet.microsoft.com/en-us/library/ff700229.aspx

High Process Memory

Symptoms

- When a single process is using too much memory failures can manifest in different ways.
- Usually low memory requests will still succeed, large memory requests will fail (may appear to be random).
- New processes may be unable to start if this causes a low server memory condition.
- Performance will degrade.
- Addition specific symptoms will be listed for each common occurrence breakdown.

Common Occurences

1. **w3wp.exe (IIS Application pool)**
   - Each w3wp represents a separate IIS Application pool.
   - Adding commandline column to task manager provides visibility to which application pool the process represents
   - The Descartes Route Planner installer automatically configures IIS to recycle any application pool using more than 512mb of virtual memory (Virtual Bytes)
   - **UI Servers**
     - Usually this will be LNOSFW (almost exclusively)
   - **BIF Servers**
     - Usually this will be STAD
     - If using mobile (Descartes wGLN) and the requests are sent to the LNOSFW core listener then this might be LNOSFW application pool.
   - **BGO Servers**
     - Usually not seen, if occurs will likely be LNOSFW
   - Due to the recycle settings this may not always manifest as high memory usage, an indication of a problem instead would be a high frequency of recycles and random failures.

- o **IIS Logs can be used to identify memory related problems:**
    - |ASP_0146|New_Session_Failed
    - |540|800a01a8|Object_required:_'m_objXML'
        - **Note:** This could also be the result of a bug and not a low memory condition, this error means the expected object was missing.
    - The following baregrep regular expression will extract the error condition into a separate column:
        - [0-9]{4}-[0-9]{2}-[0-9]{2} [0-9]{2}:[0-9]{2}:[0-9]{2} [0-9]{2,3}.[0-9]{2,3}.[0-9]{2,3}.[0-9]{2,3} \w+ [/A-Za-z._]+ ([-_|0-9A-Za-Z]+).* 500

- o The application pool recycles are logged in the **System eventlog** as **Informational** with a source of **W3SVC** and eventid **5077**.
    - **Note:** In the example below the recycle is happening every 5-6 minutes, consider that this server is one of a pool and not receiving every request.

- o If this is occurring then **reconfigure the recycle limit** to 5gb (add an extra 0) and **monitor for a period of 24-48 using Perfmon (Virtual Bytes)** hours **of normal operation** and then re-assess the appropriate configuration limit. IF no errors are logged into IIS Log with this new configuration use the peak, if errors start to occur, remove the top 5-10% of memory peaks.
  - ▪ **Note:** in the example below the configuration limit was adjust to ~750-900mb.
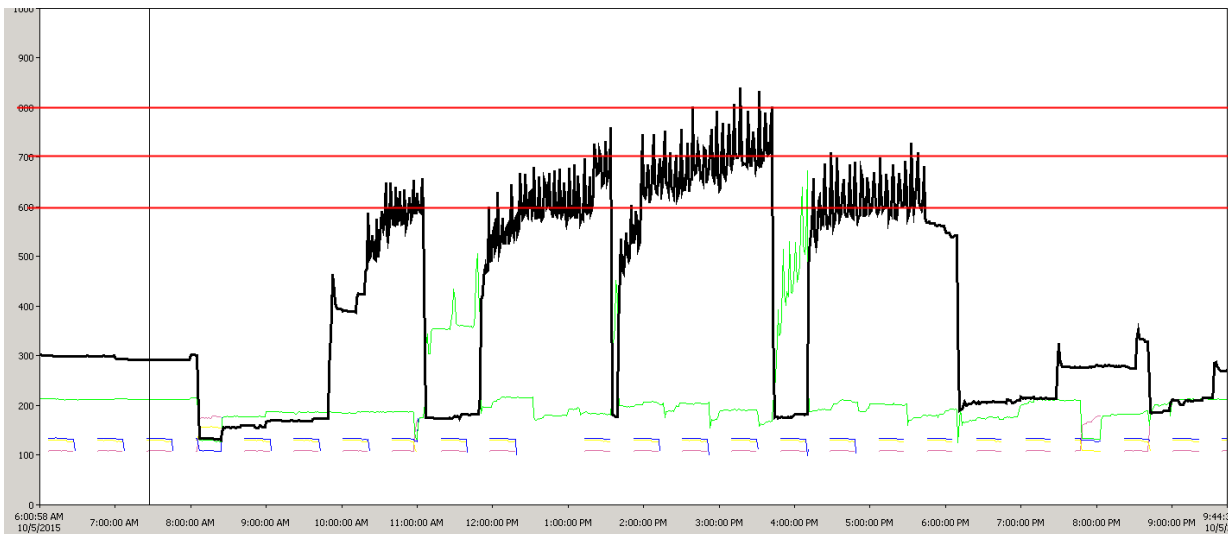
- o This may not be a problem with the process itself or the application, but the result of the use cases of the customer integration. It is important however to assess if there are requests transmitting a lot of data, these usually result in higher memory utilization and should be reconsidered or investigated for optimizations in data reduction. The **amount of data being sent** by the server can be seen in the column **sc-bytes** in the IIS log.

2. **DCFProcessService.exe (LNOS$/DCF$ service)**
   - o This process is used to run the DCF$/LNOS$ services, for RP this is associated with an optimizer service (e.g. OptDisp = RMPI, Adapi = ADAPI, Opt = RMPI, etc.)
   - o Usually this process will utilize 80-400mb, it can run safely up to approximately 800mb and may continue operating up to 1.2gb or higher however **greater than 900mb the risk of requests failing significantly increases**.
   - o **In addition** when individual processes use more than 500mb, depending on how many are using this amount of memory **the risk of a server out of memory condition increases**.
   - o **RestartCOM TestDCFServices** task checks for too much memory utilization and is designed to restart before it reaches 900mb, this however requires it to be configured with an appropriate memory threshold -- see hosting guide for the latest recommendations.

3. **dllhost.exe (COM+ Application)**
   - o This process is used to run the **DCF COM+** Application, the process identity will be the "administrator" service account used by LNOS (RP).
   - o Like IIS there is configured recycle limit, unfortunately **there is no eventlog message written when COM+ recycles** due to a high memory condition.
   - o Use **perfmon to track memory utilization over time**
     - ▪ Look for spikes indicating a specific operation - IIS logs can sometimes t be used to help correlate certain actions.
     - ▪ Look for gradual increases without decrease - indicates a leak

19 New Server Checklist

When a new server is created the following tasks should always be performed or at least reviewed. This table can be printed for quick reference.

Completed?	Task Name	Task Details
	Deploy map edits	If using LMB maps the map edit files should be deployed to the new server.
	Configure RestartCOM scheduled tasks	RestartCOM scheduled tasks should be configured (timing and **thresholds**) based on the customer environment requirements, see Hosting Considerations document for best practices.
	Enable IIS Tracing (Windows® 2008 R2)	Install IIS tracing and download and run the IIS Tracing Script.
	Configure service and queue monitoring	Monitoring should be setup for the new server, see Hosting Considerations document for best practices.
	Set Maximum Lifetime Limit on DFL server	Dedicated DFL servers (used for integration) should have the Maximum Lifetime limit of the COM+ application configured to 0 (unlimited).
	Add Server to appropriate pool/cluster	Once the install and other tasks are completed the server should be added to the appropriate load balanced pool or cluster.
	Copy Customized Files	Custom Manifest XSL Skins POD Sheet etc
	Copy XML Scheduler config	Copy XML Scheduler utility, configuration files and schedules (if required)
	Load Balancer Filter (to show real IP)	see utilities or; if using Windows® 2012 R2 or later: http://www.iis.net/learn/get-started/whats-new-in-iis-85/enhanced-logging-for-iis85 or; (powershell) import-module WebAdministration; New-ItemProperty 'IIS:\Sites\Default Web Site' -Name logfile.customFields.collection -Value @{logFieldName='OriginalIP';sourceType='RequestHeader';sourceName='X-FORWARDED-FOR'}
	DiagPath age	If using dataflow, update HKLM\Software\Descartes\Dataflow\DiagPath\DaysToKeep to an appropriate value for the new environment.

20 DB or Org Migrations

20.1 Clone an FW/RP Org

In some cases, it is desirable to copy an org or migrate the details of one org to another. When it is just the "FW" database it is simple however if the security database is replaced a few SQL scripts must be run to update the name or the org contained within this database.

1. Create new org through setup utility (or activate through setup UI for full installs)
2. Restore existing org db's over db's created by installer for new org
3. Follow the steps in **Sub Task - Update LNOS account details** to update the internal account details. This must be done in the both the DCF core database as well as the Security database of the new organization (DCFSec_xxx or SecXXX).
4. Follow the steps in **Sub Task - Fix SQL Views** to update the SQL views for the new organization.
5. See **Sub Task - RPS Considerations** for some concerns unique to RPS if applicable.

20.2 Rename an FW/RP Org

In order to rename an organization several changes need to occur:

1. All the databases need to be renamed
2. All the org/database pointers in the DCF db need to be renamed
3. All the org/database pointers in the security db need to be renamed
4. All the views in the "application" databases need to be updated for the new security db name.

1. Follow the steps in **Sub Task - Rename DB** to rename the existing databases for the new org.
2. Follow the steps in **Sub Task - Update DCF Pointers** to update the internal database pointers to the new organization and db name. This query will need to be run in from the DCF core database.
3. Follow the steps in **Sub Task- Update LNOS account details** to update the internal account details. This must be done in the both the DCF core database as well as the Security database of the new organization (DCFSec_xxx or SecXXX).
4. Follow the steps in **Sub Task - Fix SQL Views** to update the SQL views to the new database name.
5. see **Sub Task - RPS Considerations** for some concerns unique to RPS if applicable.

20.3 Restore Over Existing (Different) Org

Sometimes it is necessary to replace one organization's data with another. This is usually happens when there are multiple external environments communicating with a single LNOS environment through the use of different orgs. Another common use cases is restoring a copy of production over top of a "training" organization.

The steps are a combination of a database migration as well as the renaming of an organization. The first step is to follow the instructions in **Migrate an Org**. Once this has been completed the following instructions from **Rename an Org** must be executed. Follow the steps in **Sub Task - Update LNOS account details** to update the internal account details. This must be done in the both the DCF core database as well as the Security database of the new organization (DCFSec_xxx or SecXXX). See **Sub Task - RPS Considerations** for some concerns unique to RPS if applicable.

20.4 Migrate an Org (to a new environment)

The following are the generalized steps to migrate an organization from one sql server to another. For hosted customers, the steps provided in the RFC should only include those relevant to the request.

Obtain backup of "Original" database

Backup all Descartes Route Planner DB's for the organization (each region will have:LNOSFW_DBNAME, DCFSec_ DBNAME, ShipperTAD_ DBNAME).

NOTE: Do not restore the "DCF" database.

NOTE: If no new schedules or security changes were created the DCFSec does not need to be restored on subsequent migrations.

Replace Organization Databases from Backup

Databases to be restored:
   a.   DCFSec_[OrgName]   or Sec[OrgName]
   b.   LNOSFW_[OrgName]   or FW[OrgName]
   c.   ShipperTAD_[OrgName] or Stad[OrgName]

1. Right click on the new database you wish to restore, and select **Tasks > Restore > From Database**.
2. Select the **From Device:** radio button.
3. Select the ellipsis (**...**) and choose the backup file of the other database you wish to restore from.
4. Select the backup set you wish to restore from by selecting the check box to the left of the backup set.
5. Select **Options**.
6. **If the database already exists:**
   a. Select **Overwrite** the existing database (WITH REPLACE) Important:
7. **If the new database does not have the same name as the original database:**
   a. Change the Restore As Rows Data file name to the file name of the existing database you wish to overwrite or just give it a new name.
   b. Do the same with the log file name.
8. **Kill open processes against target (new) database**
   a. From the toolbar, click the Activity Monitor button.
   b. Click processes. Filter by the database you want to restore. Kill all running processes by right clicking on each process and selecting "kill process".
   c. Right click on the database you wish to restore, Tasks-->Take Database Offline
   d. Verify from the Activity Monitor Screen that no new processes were spawned. If they were, kill them.
9. Click **OK** to restore the database. Wait for the database to be restored.
10. Repeat above steps for each database to be restored.

SQL Account (e.g. TMOSystem) DB Account Drop/Replace (New SQL Server ONLY)

The following step only need to be done on the first migration.

1. Drop the application SQL DB User (e.g. TMOSystem for RP) account in Destination databse Server.
2. From the Source Database Server, script out the TMOSystem DB User account
3. Script in the TMOSystem account in Destination Database Server

NOTE: For hosted environments this account will follow the convention FW**xxx**System**xxx**

Fix Login SID's (if restoring to a different, existing SQL instance)

Correct SID for TMOSystem account (or alternative SQL Login ID): Perform the following script in Destination Database Server, repeat for each database restored.

```
a.  USE LNOSFW_Acme
b.  EXEC dbo.sp_change_users_login @Action = 'Update_One',
                                   @UserNamePattern = 'TMOSystem',
                                   @LoginName = 'TMOSystem'
```

NOTE: If there are other company database accounts, they should be added and fixed as well.

Upgrade to appropriate version.

The restored database may be an older version than the environment's servers, in this case the installer must be rerun on a server in that environment to upgrade the database.

Update External References

Follow the steps in DB or Org Migrate - Update External References to update the configuration settings for the applications installed.

20.5 Sub Tasks

20.5.1 Rename DB

The sql statements can be auto-generated using the following query. Run this query then copy the results and run those if they selected the appropriate databases.

```
use dcf
declare @oldorg nvarchar(32)
declare @neworg nvarchar(32)
declare @exec bit

set @oldorg= 'Acme'
set @neworg= 'AcmeNew'

select 'alter database '+databasename+' set offline with rollback immediate;
exec sp_renamedb '''+DatabaseName+''','''+Replace(DatabaseName,@oldorg,@neworg)+''';
alter database '+Replace(DatabaseName,@oldorg,@neworg)+' set online;
'
  from DCFHost h
  join master..sysdatabases db on h.DatabaseName=db.name
  where DatabaseName like '%'+@oldorg
```

20.5.2 Update DCF Pointers

The following SQL Script can be run, make sure to set @Exec=1 to perform the changes, set it to 0 to preview the changes (Default).

```sql
use dcf
/* ********************************
* Rename org from @oldorg to @neworg
* set @exec=0 to preview changes
* set @exec=1 to make the changes
******************************** */
declare @oldorg nvarchar(32)
declare @neworg nvarchar(32)
declare @exec bit
set @oldorg= 'Acme'
set @neworg= 'AcmeNew'
set @exec=0


IF @exec=0
BEGIN
      --update DCFOrg set
      select
DatabaseName=Replace(DatabaseName,@oldorg,@neworg),connectstring=Replace(connectstring,@old
org,@neworg)
      from DCFHost
      where DatabaseName like '%'+@oldorg
END
ELSE
BEGIN
      update DCFHost set
      --select
      DatabaseName=Replace(DatabaseName,@oldorg,@neworg),connectstring=Replace(connectstrin
g,@oldorg,@neworg)
      from DCFOrg
      where DatabaseName like '%'+@oldorg
END
IF @exec=0
BEGIN
      select OrgName=@neworg
      from DCFOrg
      where /*OrgID=5 and*/ OrgName=@oldorg
END
ELSE
BEGIN
      update DCFOrg set
      OrgName=@neworg
      from DCFOrg
      where /*OrgID=5 and*/ OrgName=@oldorg
END


--update DCFOrg set
IF @exec=0
BEGIN
      --update CtyUser set
      select LoginName=REPLACE(loginname,@oldorg+'-',@neworg+'-')
```

```
        from CtyUser
        where LoginName like @oldorg+'-%'
END
ELSE
BEGIN
update CtyUser set
        --select
        LoginName=REPLACE(loginname,@oldorg+'-',@neworg+'-')
        from CtyUser
        where LoginName like @oldorg+'-%'
END
-- will not do anything unless "full/activated" org
IF @exec=0
BEGIN
        --update CtyUserGrp set
        select
        UserGrpName=REPLACE(UserGrpName,@oldorg+'-',@neworg+'-')
        from CtyUserGrp
        where UserGrpName like @oldorg+'-%'END
ELSE
BEGIN
        update CtyUserGrp set
        --select
        UserGrpName=REPLACE(UserGrpName,@oldorg+'-',@neworg+'-')
        from CtyUserGrp
        where UserGrpName like @oldorg+'-%'
END
```

20.5.3 Update LNOS Account Details

Run the following SQL script to change the orgname in the ctyuser, dcforg, ctyusergrp tables in the restored databases by updating the highlighted sections below.

```
use dcfsec_Acme
/* *******************************
* Rename org from @oldorg to @neworg
* run from SecXXX and DCF db
* set @exec=0 to preview changes
* set @exec=1 to make the changes
******************************* */

declare @oldorg nvarchar(32)
declare @neworg nvarchar(32)
declare @exec bit

set @oldorg= 'Acme'
set @neworg= 'AcmeNew'
set @exec=0


IF @exec=0
BEGIN
        select OrgName=@neworg
        from DCFOrg
```

```
        where /*OrgID=5 and*/ OrgName=@oldorg
END
ELSE
BEGIN
        update DCFOrg set
        OrgName=@neworg
        from DCFOrg
        where /*OrgID=5 and*/ OrgName=@oldorg
END

IF @exec=0
BEGIN
        select LoginName=REPLACE(loginname,@oldorg+'-',@neworg+'-')
        from CtyUser
        where LoginName like @oldorg+'-%'
END
ELSE
BEGIN
        update CtyUser set
        LoginName=REPLACE(loginname,@oldorg+'-',@neworg+'-')
        from CtyUser
        where LoginName like @oldorg+'-%'
END

-- will not do anything unless "full/activated" org
IF @exec=0
BEGIN
        select
        UserGrpName=REPLACE(UserGrpName,@oldorg+'-',@neworg+'-')
        from CtyUserGrp
        where UserGrpName like @oldorg+'-%'
        UNION ALL
        select
        UserGrpName=REPLACE(UserGrpName,@oldorg+' - ',@neworg+' - ')
        from CtyUserGrp
        where UserGrpName like @oldorg+' - %'
END
ELSE
BEGIN
        update CtyUserGrp set
        UserGrpName=REPLACE(UserGrpName,@oldorg+'-',@neworg+'-')
        from CtyUserGrp
        where UserGrpName like @oldorg+'-%'
        update CtyUserGrp set
        UserGrpName=REPLACE(UserGrpName,@oldorg+' - ',@neworg+' - ')
        from CtyUserGrp
        where UserGrpName like @oldorg+' - %'

END
```

20.5.4 Update External References

The post-migration configuration settings vary by product. They are a subset of the **New Org Checklist** steps.

Descartes Route Planner

Updating Application Configurations
1. Login to the Descartes Route Planner UI.
2. Go to **App Setup > Application Configuration**.
3. Update the publishing path accordingly for the destination environment.
   C:\inetpub\wwwroot\LNOS FW UI\GeneratedFiles\PublishedFiles
4. Update schedule settings for publishing, if different than the global settings.

Updating INI file Reference Values (CtySysValue)
1. Login to the Descartes Route Planner UI.
2. Go to **App Setup > System Values**.
3. Update the path for the queues and INI files accordingly for the destination environment.
4. Update any reference to server names in their path, if any.
   Note: "\" and "\\" could be searched in the search criteria.
5. Verify the INI files referenced exists on the servers of the new environment.

Updating Map Server URLs
1. Login to the Descartes Route Planner UI using SecAdmin ([Org]/[Org]-secadmin/cs). Ignore Permission Error.
2. Go to Setup menu > Profile items.
3. Search "org" in right top corner.
4. There should be one FW.OrgSettings.
5. Right click and edit org item.
6. Update the MAP Server URL to point the map server in Destination Environment.
7. Save and exit.

Values:

DSG Map Service

http://MAPSERVER/TileServer/GetTile.aspx

Descartes AltaMap
http://MAPSERVER/geoserverws/service1.asmx

Log into RP UI as CompanyName/username/password. Browse to App Set Up/System Values. Search for "external". Edit value http://MAPSERVER/PathingService/lnospathingservice.aspx for ExternalRoadRouter if changed.

To Prevent Optimization failure:

After Upgrading Migrated DB run the following query to confirm correct value in all FW DB

Select * from CtySysValue where Keyword like 'RmpiINI_OPTASYNC_Q1

If no results run:

Update ctysysvalue set keyword= 'RmpiINI1_OPTASYNC_Q1' where Keyword= 'RmpiINI_OPTASYNC_Q1'

Transportation Manager (TM/RST)
Update CtyExtFileConfig and CtySysValue if required.

Reporting Services (RPS)
See **Sub Task - RPS Considerations** for details.

Visibility (Viz)
Dock Appointments (DA)

20.5.5 RPS Considerations
Descartes Reporting Services poses unique problems when migrating to a database with a new name or if an existing database is being renamed. This is because RPS has pointers to the other LNOS databases other than just security.

While the steps in **Sub Task - Fix SQL Views** will address the immediate changes it does not update the RPS meta data. What this means is if a user attempts to modify a datasource after the fact it will revert to the wrong database name which will either fail entirely (does not exist) or silently work but with the wrong database name.

The only way to address this is to edit the RPS datasources **through the UI** and **manually correct the db names**. The list of sources requiring modification can be determined by the list of views identified in the Fix SQL Views instructions, each "source" will have a view named ID[#]_Data_SourceName.

In addition to the Data sources another place where pointers could exist is in the **Expression Functions**. Each expression function will create a SQL function. The meta data however is stored as a bin object in sql so **must be corrected through the UI**.

The list of affected functions can be found by querying the syscomments table, e.g. select * from syscomments where text like '%FWAcme%'. Again fixing them via SQL does not fix the RPS meta data they must be fixed through the Descartes Reporting Services UI.

20.5.6 Fix SQL View
For standalone route planner installations:
Rerun LNOSSetup installer. If the Descartes Route Planner version is the same, choose no components, otherwise select LNOSFW, TOE, Core DCF Security. This step is important as the installer will automatically update the internal views to the various databases.

For Full installations or installations involving other LNOS applications:
If other applications are installed the FW installer will not correct their views automatically, they will need to be manually updated. The following query will return the altered views which can then be run manually. There is approximately 9 views to update per database.

The following query must be run in all "application" databases for the organization (e.g. FWAcme, RPSAcme, SecAcme, TMAcme, etc.)

```
use RPSAcme
declare @oldorg nvarchar(32)
declare @neworg nvarchar(32)
set @oldorg= 'Acme'
set @neworg= 'AcmeNew'

select REPLACE(REPLACE(text,h.DatabaseName,Replace(DatabaseName,@oldorg,@neworg)),'CREATE
VIEW','ALTER VIEW')+';GO;'
from syscomments c
```

```
join DCF..DCFHost h on c.text like '%'+DatabaseName+'%'
join master..sysdatabases db on h.DatabaseName=db.name
where DatabaseName like '%'+@oldorg


UNION ALL


select REPLACE(REPLACE(text,Replace(DatabaseName,@neworg,@oldorg),h.DatabaseName),'CREATE
VIEW','ALTER VIEW')+';GO;'
from syscomments c
join DCF..DCFHost h on c.text like '%'+Replace(DatabaseName,@neworg,@oldorg)+'%'
join master..sysdatabases db on h.DatabaseName=db.name
where DatabaseName like '%'+@neworg
```

The following query can be run to update stored procedures usually in RPS DB

```
SELECT REPLACE(REPLACE(text,'RpsAcme','RpsAcmeNew'),'CREATE PROCEDURE','ALTER
PROCEDURE')+';GO;'
FROM syscomments
WHERE id in (SELECT id FROM sysobjects WHERE name in (SELECT name FROM sysobjects WHERE
type = 'P' AND category = 0) )
and (text like '%Acme%')
```

21 Installation Failures

Installation can fail for several different reasons. The most common reasons are incorrectly configured Microsoft® Distributed Transaction Coordinator® on the Application and/or SQL server or incorrect server/account details. This section will try and walk through and diagnose the common failure points and provide tips on how to resolve these issues.

21.1 Problem/Error: Services Not Created/Registered

After installing none of the DCF$ or LNOS$ services are registered.

Root cause:
Incorrect administrator information was provided.

Resolution:
Open LNOSSetup.exe, go to administrator Information tab, retype user/password, makes sure to include the domain name in the format domain\user.

21.2 Problem/Error: DB Account SID mismatch

Cannot restore/createDB dbname on sqlserver [**unable to create login to database dbname unable to create login TMOSystem** for dbname database [The server princiapl InstallAccount is not able to access the database "dbname" under the current security context.]]

Root cause:
The SecurityID (SID) for the TMOSystem account does not match between the database and the SQL server. This normally occurs if the account is created manually, the database is being restored from another SQL server or the installation is not being executed with SysAdmin privileges.

Resolution:
STEP 1. Change database context, in this case using DCF_Kline db, change as required...
USE dbname

STEP 2. Generate the report of orphaned users, if no data retuned no orphaned users...
EXEC dbo.sp_change_users_login @Action = 'Report'

STEP 3. IF oprhaned user found by STEP2 check that an associated LOGIN exists with the same name and if it does use following command to sync. This example synchs TMOSystem login, for other logins change TMOSystem to desired user/login pair.
EXEC dbo.sp_change_users_login @Action = 'Update_One',
    @UserNamePattern = 'TMOSystem',
    @LoginName = 'TMOSystem'

NOTE: If the SQL installation account is not a SysAdmin the default schema for the TMOSystem account will need to be configured as "dbo"

Problem/Error: (Microsoft® Distributed Transaction Coordinator® Enlist errors)
TestTransactionCall: <DCFCodeBookmark Class="CCtyDALImpl Method="createConnection" File=".\CtyDALImpl.cpp" FileTimeStamp="1900-12-31T00.00.00" ClassTimeStamp= Line=367"

/><TransactionID>{GUID}</TransactionID><Paramater Name="@source" Value="Microsoft OLE DB Provider for SQL Server"/>

Root cause:
The COM+ is not able to establish a Microsoft® Distributed Transaction Coordinator® connection to/from the SQL Server. Microsoft® Distributed Transaction Coordinator® requires 2-way communication between the app and SQL server, there can be a number of configuration points that affect this problem.

Resolution:
Verify Microsoft® Distributed Transaction Coordinator® is correctly configured on both the Application Server and SQL Server.

NOTE: A restart of the SQL service may be required in some instances for this to take effect.

Verify Windows® Firewall is disabled or Microsoft® Distributed Transaction Coordinator® exclusions are enabled.
http://technet.microsoft.com/en-us/library/cc725913(v=ws.10).aspx

Verify there is no hardware firewall between the App and SQL Server, if there is follow Microsoft® best practices for configuring Distributed Transaction Coordinator® exclusions. The following article describes further troubleshooting steps and how to configure the Distributed Transaction Coordinator® exclusions.
http://support.microsoft.com/kb/306843

This normally occurs if the account is created manually or the database is being restored from another SQL server.

21.3 Problem/Error: Bad Service Account Password

Cannot register COM components, cannot set Local Admin Password: set it manually in Component Services {the identity or password set on the applicaiton is not valid (Exception from HRESULT: 0x80110414)} True 0]

Root cause:
The password specified in the Administrator information tab is incorrect.

Resolution:
Retype the password and rerun the installation.

NOTE: The account may become locked out because of this issue.

Problem/Error: The specified path was not found (MapServer and ChartEngine ONLY)
When installing Descartes Route Planner the ChartEngine and MapServer UI's cannot be installed but other UI's can be on servers with a name > 15 characters.
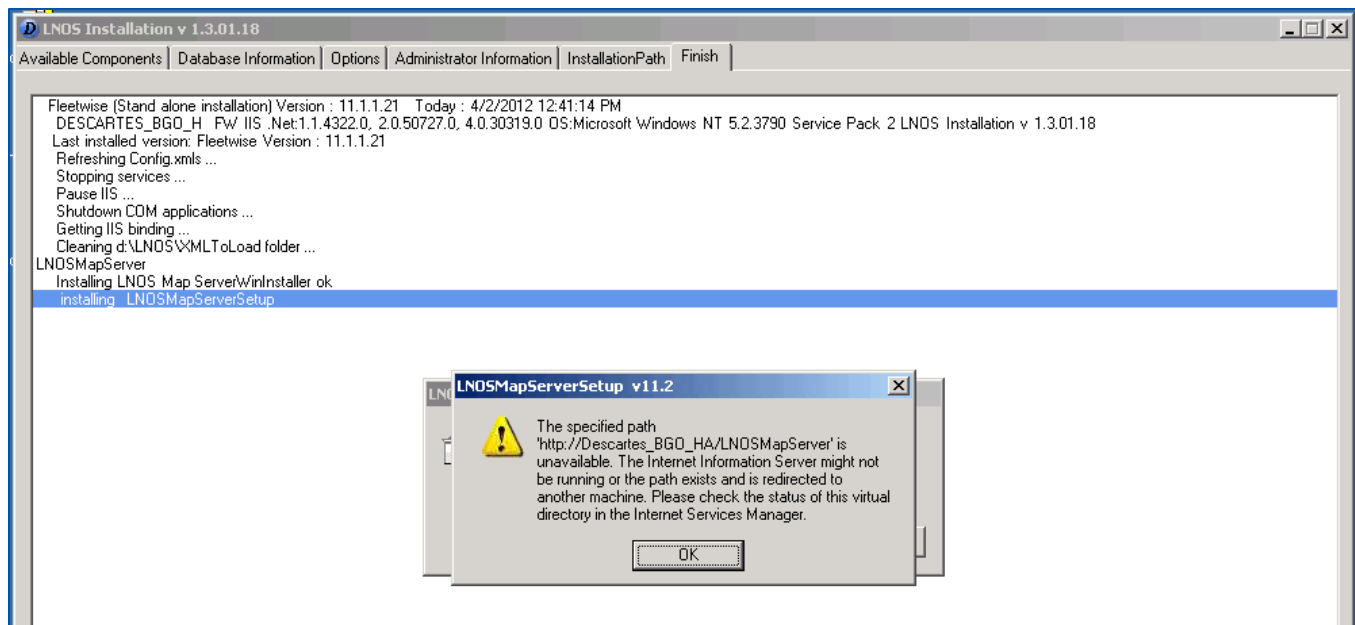
Root Cause:

IIS6 (Windows® 2003) seems to have a 15 character limit on the server name, the installer does not recognize this and cannot find the web UI, only affects these legacy components. This has not been tested or confirmed on Windows® 2008 so may still be an issue.

Resolution:

Rename the server to be less than 15 characters and rerun the installer.

21.4 Version Specific Problems

V11.x Problem/Error: Hangs indefinitely on shrinking databases.

V11.x Problem/Error: After installation users cannot load dashboard when upgraded from 11.x to 12.x or higher

V13.1.3.x Problem/Error: In some deployments users were unable to login after upgrading. Verify the COM+ application was deployed correctly, see Rebuild DCF COM+ Application for details on how to confirm this and rebuild the component.

21.5 Creating New ORG Error Due to SQL Server Backup Device Issue

21.5.1 Problem/Error: Unable to Create New Organization

Warning: Unable to create new organization [Backup Database is terminating abnormally
Sec bak because it was originally formatted with sector size 4096 and is now with sector size 512.1

Resolution: Uninstall and re-install SQL server then uninstall and re-install Descartes Route Planner. Contact Descartes for support.

22 Planning an Upgrade

22.1 Version-specific concerns

When upgrading from one major version to another certain configuration items may be lost or problems could occur, this page is intended to track these problems between major releases.

- 7.x to 8.x
  - Major database schema changes - UI profiles are lost
  - Fast publish SysValue needs to be configured to 1 (old versions default this to 0)
- 8.2 to 9.1
  - FW publish path is lost (was file based, now is db based)
  - LZA swap file is overwritten if zoneswapkey is specified at schedule level
  - Fast publish SysValue needs to be configured to 1 (old versions default this to 0)
- 10.1 to 10.2
  - Need to run script to fix ui profiles (split by language)
  - STAD publish goes to same folder as FW (prior versions these could be different).
  - Fast publish SysValue needs to be configured to 1 (old versions default this to 0)
  - 10.2 to 11.1
    - UI profiles are lost
    - Fast publish SysValue needs to be configured to 1 (old versions default this to 0)
    - 11.1 to 12.1
      - Custom Manifest UDFS moved from DocStop -> DocStop/FWStopLocation
      - UI profiles are lost
      - New mapping technology
      - LNOSLic db may be broken due to shrink file bug, it is recommended to either check the LNOSLic db for very old sysprocesses or restart the SQL instance at the start of the maintenance to ensure this problem is resolved. Symptom: user logs in and gets no menu but no dashboard.
      - Publish Route Scheduled Task now has a ApplyFWOnly flag (defaults to true), it will use FW publish path instead of the STAD publish path, this was introduced in 12.1.3 or 12.1.4. This impacts customers who use different publish paths for scheduled publishes and UI, it also affects customers requesting route details as the behavior is now different and should be reviewed.
      - Bad driver/truck assignments can break the install during creation of the crew assignment tables.
        - The following queries should be used prior to upgrading:
    - Remove invalid assets from table
      - Delete from fwdriver where driverkey is null or driverkey=''
      - Delete from fwtruck where truckkey is null or truckkey=''
      - Delete from fwtrailer where trailerkey is null or trailerkey=''
    - Remove driverid references to drivers that do not exist
      - Update rt
      - Set driverid=null, driverkey=null
      - From fwroutetemplate rt
      - Left Join fwdriver d on rt.driverid=d.driverid
      - Where d.driverid is null
      - Fast publish SysValue needs to be configured to 1 (old versions default this to 0)
    - 12.1 to 13.1
      - Fast publish SysValue needs to be configured to 1 (old versions default this to 0)
    - 13.1 to 13.2
      - Previously defined filters are not editable - they will still work but if they need to be changed the criteria elements will need to be reconfigured.

- Map no longer works if using Descartes AltaMap - need to add /GetTile.aspx to the URL, so it should now be: http://[server]/TileServer/GetTile.aspx
- 13.2.1.x fast publish SysValue needs to be configured to 1 (old versions default this to 0), this setting is removed as of 13.2.2
- Advise call require UpdateSource attribute to be provided (empty or true) even if not using updatesource feature. Affects existing interfaces.
- 13.2.2.7 FW_Scheduler_LNOS services won't start, use DCFBGOSetup.msi from 13.2.2.5
- UI Profiles Lost?
    - create new org "default" profile in test/preprod
    - use CopyProfile tool to migrate from test to production after upgrading as part of migration checklist
- 13.2 to 14.1.1
    - Pathing service URL changed from /MapEditor/ to /PathingService/
        - local.properties (ExtPathingService)
        - App Setup>System Values (ExtPathingURL)
    - Descartes AltaMap split from 3->5 web sites, web.config's will need to be updated manually.
    - Custom icons mappings from earlier version may not be editable and will need to be recreated.
    - UI Territories were renamed to be global instead of schedule specific, resources/templates cleanup may be required.
- 14.2.1
    - Added publishing in batches, default value after upgrade is 5. This may need to be adjusted to 0 to preserve existing settings due to impact on customer interfaces.
- 14.2.2
    - LNOSPANapiLegacy dll's are no longer required, if there is an error related to these, delete the files from the bin folder and rerun the installer
    - Major changes to Descartes AltaMap logging
- 14.2 to 15.1
    - All passwords in DCFHost table are encrypted, see Planning a RP 15.1 Upgrade for details on how to manage this.

22.2 Descartes Route Planner 15.1 Upgrade

Descartes Route Planner 15.1 is the first version to encrypt the passwords in the DCFHost table (DCF database). There is however a negative side effect of this encryption. The SQL connection account (usually TMOSystem) is locked out mid-install. It requires special planning to upgrade to 15.1 to account for this major change in connectivity. To prevent this from happening the following steps must be followed for any upgrade of a version prior 15.1 to post-15.1.

1) Disable UI, Mobile, customer interfaces, disable scheduled RP Tasks (XML Scheduler, etc)
    a. If unable to do so, see step 2a
2) RDP to all servers
    a. If step #1 was not completed, disable the DCF COM+ application from component services console
        i. This will prevent it from being started by a user/system request and locking out the TMOSystem account
    b. Open RestartCOM, choose Stop Services
    c. Either stop task scheduler service or disable the RestartCOM scheduled tasks (if no permissions to do so) to prevent the health checks from re-starting the services
3) Verify TMOSystem account is NOT locked out on SQL Server
4) Upgrade 1 server
    a. Prior to upgrading re-enable DCF COM+ application

b. Verify install is correct, verify able to login to application
c. Re-enable scheduled tasks or start task scheduler service, depending on what you did in step #3
5) Upgrade all the servers
a. Prior to upgrading re-enable DCF COM+ application
b. As each server upgrade finishes either start the task scheduler (installer should do this) or re-enable the jobs depending on your resolution of step #3
6) Re-enable interfaces
7) Resume normal operations

22.3 Common Problems after Upgrade

After an upgrade in production or test users may encounter problems with functions that worked previously or interfaces involving criteria (scheduled tasks).

When trying to optimize the following error is presented:

Exception occurred. Optimization was rolled back
Reason: <DCFException><DCFCodeBookmark Class="NA"
Method=getRMPIConfigFile=.\RMPILegagacyTaskBS.cop" FileTimeStamp="1900-12-31T00:00:00"
ClassTimeStamp="1900-12-31"T00:00:00" Line="5838"/><Parameter Name="text" Value=="Keyword
RMPIINI1_OPTASYNC_Q1 not found. And connectionString is Server (continued)
By searching in the system values for "RMPI" and re-saving existing values (shown in bold above) sited in the error the error should no longer appear when attempting to optimize a route.

If the user is unable to access previously accessible screens (user not authorized or page cannot be displayed) this is normally caused by the introduction of a new fngrp either to clean up security or due to new functions being added to the application.

22.3.1 Test Upgrade

Investigate the failed UI operation using Page Cannot be Found Error. This may require the creation/modification of a custom role. Investigate the failed Interface operation using Command Failure messages.

22.3.2 Production Upgrade

Re-test the UI operation with a **similar** account in test (not fw-admin). If it works then likely the custom role changes were not migrated to production. Compare the fngrps on any custom roles between the environments. Also confirm the roles are configured the same on the users. Otherwise, investigate as a new problem using Page Cannot be Found Error.

Re-test the command (using XML **manually**) in the test environment. If it fails in the test environment this functionality may not have been tested prior. If it was tested and worked, compare the customer integration XML's in both environments as most likely a change was not promoted to production. Otherwise investigate as a new problem using Command Failure messages.

23 Frequently Asked Questions

23.1 Descartes Route Planner API Queuing

Descartes Route planner queue optimization calls are single-threaded, to allow for more than one request simultaneously to the optimizer we can setup queue services for different operations and even multiple services for the same group of operations. Each service reads from a designated queue. It is impossible to predict which service will act on a request if there is more than one however each service can only work one queued request at a time.

The following table provides a summary of the more common operations going through each queue. This list is not definitive but provides a guide as to which operations involve which queues. If the queue is not enabled the task occurs in the component itself instead.

Group	Operation/API	Queues						
		Advise/Adapi	Confirm	OptUI	Rmpi/Opt	OptDisp	GCPI	OptAsync
UI				X				
	Resequence			X				
	Reverse			X				
	drag/drop			X				
	Optimize All							X
	Optimize selected							X
	Edit Resource				X			
Interface	Order Update				*1		X	
	Order Add (w/ preferred route)				*1		X	
	Order Delete				*1			
	Mobile Status (arrive, complete miss)				*2	X		
	Mobile GPS (only on AVL recalculate interval)				*3	X		
Other	BGO				*4			
	Batch Processor (RunOptTask)				X			
	Batch Processor (CheckAVLEvents)				X			
	Apply Master Route (UI/Batch Processor)			X				

NOTE:

X: executes through queue if queue is enabled

*1: Order operations with TaskName="UpdateRouteAsync" do not involve queue, this is handed over to the batch processor instead

*2: The RMPI queue is involved only when a route needs to be recalculated in the 3rd phase (** need to check with brian)

*3: GPS messages are normally just written to the database (optdisp) however if use avl is configured than after X messages have been received it will recalculate the route, this is configured under data>schedules>avl, this will go under RMPI/Opt queue.

*4: BGO only involves a queue when it runs into a profit mismatch and requests the route to be refreshed by LNOS. It will also use queue when in dispatch-bgo mode.

23.2 How to Install .NET into IIS

For .NET to be properly installed in an IIS environment it must be installed AFTER IIS is installed, if not it will fail to register itself correctly and will not setup the IIS extensions. This can manifest itself as a 404 page not found error when trying to open a web URL with a valid .aspx page.

To manually configure .NET into the IIS instance the aspnet utility must be utilized.

1. Open a command prompt (console) window.
2. use the following command to navigate to the framework folder for you version:
    a. CD C:\Windows\Microsoft.NET\Framework64\v4.0.30319
    b. The Framework folder will be just "Framework" for 32-bit versions.
    c. The v#### will vary depending on which version requires installation.
        i. v2.0.50727
        ii. v3.0
        iii. v3.5
        iv. v4.0.30319
3. Run the following command to register asp.net.
    a. ASPNET_REGIIS -i

23.3 How to Move the wwwroot Folder to a New Drive

1. Copy the inetpub folder to the new drive and open IIS Manager 7 for the rest of the steps.
2. Update the Default Web Site and all sub applications to the new drive letter:
    a. Select the item and click Basic Settings on the Actions Menu (right side).
3. Add IUSR permissions to the new wwwroot folder:
    a. Right click Default Web Site and click **Edit Permissions**
    b. Select the **Security** tab and click **Edit**
    c. Click **Add**, click **Locations**, select the server name and click **OK**.
    d. Enter IUSR in the textbox and click **Check Names**. If the name is now underlined that means it is found/correct, click **OK**.
    e. Select IUSR in the list and check **Allow Full control**, click **OK**.
4. Update the LNOSMapServer path:
    a. Select the local server and double-click on ISAPI and CGI Restrictions
    b. Double click the LNOSMapServer and update the driver letter, click **OK**.
5. Restart IIS, remame the old folder to ensure it is not being used and try browsing to http://localhost/lnosfwui and logging in
6. If you are able to login and there are no errors delete the old folder

Alternative this can be accomplished by the following script:

```
xcopy c:\inetpub\wwwroot [targetdrive]:\inetpub\wwwroot /E /O /I
%windir%\system32\inetsrv\appcmd set vdir "Default Web Site/" -
physicalPath:[targetdrive]:\inetpub\wwwroot
```

The log file can be moved using:

```
%windir%\system32\inetsrv\appcmd set config -section:system.applicationHost/sites -
siteDefaults.logfile.directory:"[targetdrive]:\inetpub\logs\logfiles"
%windir%\system32\inetsrv\appcmd set config -section:system.applicationHost/log -
centralBinaryLogFile.directory:"[targetdrive]:\inetpub\logs\logfiles"
%windir%\system32\inetsrv\appcmd set config -section:system.applicationHost/log -
centralW3CLogFile.directory:"[targetdrive]:\inetpub
```

23.4 What Are Stop/Route Violations

When a stop is placed on a route in a position where it is no longer feasible it will create a violation within the application. The individual stop(s) affected can each have one or more violations associated with them and the route will have a list of all violations that occurred on the stops. Descartes Route Planner uses an icon to notify users there is a violation on a stop however only one icon is displayed, if more details are needed the "Alerts" column can be added to the dashboard at the Route or Stop level. The violations are stored in the database in the FWRoute.ProjectedViolation and FWStop.ProjectedViolation columns. This column contains a Bit Mask representation of the violations present.

The following table provides the position and value for each of the bits currently defined:
(Red Text is a Violation and Black Text is a warning)

Position	Decimal Value	Hex Value	Violation Description	Reasons for Violations
1	1	0x0000001	Not served for any reason. There will also be a "Y" in at least one of the following positions 2, 3, 4, 5, 6, 7, 8, 15, 16, 17, 23, 26, 27, 28.	Stop contains at least one violation from below.
2	2	0x0000002	Location not resolved	Geocode is missing.
3	4	0x0000004	Previous task not served	Double-ended or multi-task stop where one of the previous stops of the order is in violation.
4	8	0x0000008	Requirements not met	Resource requirements do not meet the Order and Location requirements simultaneously.
5	16	0x0000010	Job time window missed	Time window of stop violated per the schedule use time window setting.
6	32	0x0000020	Capacities exceeded	Order total for any measure has exceeded the measure capacity of the resource.
7	64	0x0000040	Too many stops	Route contains more stops than max stop limit set on resource or schedule

8	128	0x0000080	Dispatch out of sequence	Stops not following route position and schedule use route position is not 0.
9	256	0x0000100	Wrong preferred resource (warning)	The stop is locked to a route but is currently on a different route and schedule preferred resource warning is enabled. Note: This is **not** a violation.
10	512	0x0000200	Near time window close (warning)	The stop time window is within the schedule time window warning threshold per the schedule use time window setting. Note: This is **not** a violation.
11	1024	0x0000400	Wrong route position (warning)	Stops not following route position and schedule use route position is not 0 and schedule preferred resource warning is enabled. Note: This is **not** a violation.
12	2048	0x0000800	Dispatch unassigned (planned status)	
13	4096	0x0001000	Dispatch completed (completed status)	Once a stop receives a final status (Complete, Miss, Exception). Note: This is **not** a violation.
14	8192	0x0002000	Dispatch untimed (unscheduled status)(warning)	
15	16384	0x0004000	Missed Resource Window	Resource time constraint missed, latest end time, max drive time, etc.
16	32768	0x0008000	Invalid resource	The stop is locked to a route but is currently on a different route and schedule preferred resource warning is **not** enabled.
17	65536	0x0010000	Exceeded maximum distance	Resource calculated distance is greater than the max distance set on the schedule.
18	131072	0x0020000	Too many prototype children (warning)	

19	262144	0x0040000	Stop has received TimeBegun update	AVL status. Note: This is **not** a violation.
20	524288	0x0080000	Arrived time set for Stop	AVL status. Note: This is **not** a violation.
21	1048576	0x0100000	Commodity rules violated	Two or more stops on the route have commodities that conflict with each other based on the rules set for the schedule.
22	2097152	0x0200000	DZ distance violated	The stop is outside the Dynamic Zoning Distance set on the resource or schedule.
23	4194304	0x0400000	AvailableDateViolated	The resource earliest start date is prior to the available date/time of the order.
24	8388608	0x0800000	PickDropNotSameTrip	Double-ended or multi-task order where the Pickup and Delivery are in different trips (return to initial location) and CheckPickDropTrip constraint enabled in the INI file.
25	16777216	0x1000000	CapacityMeetsThreshold	
26	33554432	0x2000000	DESequenceViolation	Double-ended or multi-task stop where the stops are not in the order specified by Complex Pickup Sequence on the schedule. It possible values are 0 (any sequence) [default], 1 (LIFO) and 2 (FIFO) sequencing.
27	67108864	0x4000000	StopOrderViolation	Stops out of sequence as defined by schedule Sequence Same Stop Jobs.
28	134217728	0x8000000	LocationCapacitiesExceeded	Order total for any measure has exceeded the measure capacity the location can accept at one time.

For example to check for a missed window violation (position=5, value=16) the following query can be used.

Select orderkey from fwstop where ProjectedViolation and 16 > 0. What this does is does a bitwise comparison of the violation column and the # 16, if the bits match, the bit value will be returned, otherwise it will return 0.

Using our previous example:

Bit Value	128	64	32	16	8	4	2	1
ProjectedViolation	1	0	0	1	0	0	0	1
MissedWindow **(16)**	0	0	0	1	0	0	0	0
Result	0	0	0	1	0	0	0	0

or 145 and 16 = 16

If we were to check for a different violation (e.g. Requirements not met, bit value 8)

Bit Value	128	64	32	16	8	4	2	1
ProjectedViolation	1	0	0	1	0	0	0	1
Requirements Not Met **(8)**	0	0	0	0	1	0	0	0
Result	0	0	0	0	0	0	0	0

or 145 and 8 = 0

You can also determine the # of window misses on a route as an example by the following query:

```sql
select rt.resourcekey,
       sum(case when s.ProjectedViolation & 16 > 0 then 1 else 0 END) [#Missed],
       count(*) [# stops]
from fwroute rt (NOLOCK)
join fwstop s (NOLOCK) on s.routeid=rt.routeid
group by rt.resourcekey
```

23.5 What Are Master Routes

Master Routes are a way to create a template of a route. This route can be used to generate daily routes for execution or to apply a "plan" to real orders. They are accessed by going **Data > Master Route Mode**. Daily routes can be accessed again via **Data > Routing Mode**.

NOTE: In 13.2 the color scheme automatically changes when modes are changed to help make it more visible which mode a user is in.

When a real order is place it can then be assigned to the daily route based on the master route plan either by using the Apply Master Route (AMR) function through the UI or configuring the batch processor to call the apply master route function (13.2 and higher) periodically (see FAQ Batch Processor)

Some companies use a hybrid of these 2 concepts and with 13.2 it is now possible to create a daily route with "placeholder" orders, when the apply master route function is utilized if a real order is assigned by the AMR function it will replace the "placeholder" order (defined as FWOrder.ClonedFromMR=1) If scheduling the AMR externally (e.g. DFL) the options selected is a bitwise set of flags. e.g. Replace placholders and ignore line items is 528 or bits 512 and 16 or 0010 0001 0000 a UI trace is the best means to determine the appropriate set of flags.

23.6 wGLN Direct Post vs. Tunnel

wGLN RP Communication Methods	PROs	CONs
Tunnel (Small deployments only)	Contained within customer firewall, improved firewall security Can write files to local folder/UNC path Can be used with all publishing methods (XML, UI Publish, UI Publish to wGLN)	Single point of failure (multiple instances not supported) Extra hop / delay (at least 1 minute) Requires additional monitoring Requires extra configuration for each wGLN group Usually requires an extra VM (however can be run on an existing server) Files written if written to disk can be lost Not supported for large implementations (> 250? trucks) Limited retry logic (may be improved in new tunnel
Direct Post	More scalable and Redundant Better threading of work Only supported for large implementations (> 250? trucks) Application health automatically monitored by DSG Supports notification in case of delivery failures Better retry logic Optimistic completion delivery, first attempt done in real time	Requires development of an HTTP listener by client to store information into system/db Requries firewall changes on customer to allow communication from DSG hosted server Only supports HTTP Delivery method. Publish by XML and UI Publish do not go to wGLN, only UI Publish to wGLN is supported If publish by XML is required for wGLN, tunnel with upload routes only is still required

For wGLN HTTP firewall settings, please review https://www.myvan.descartes.com/docs/HTTPsuploadFAQ.pdf

The recommended approach is to open the class C subnet as we can add new servers at any time and if customer security is restricted to individual IP's traffic from the new server can/will fail.

23.7 Enable Google Maps™ from RDP

When connected to a server via RDP the google maps will not display. This can be resolved by adding the following URLs to the trusted sites list:

http://*.googleapis.com
http://maps.google.com
http://maps.gstatic.com

23.8 CommandLine and PS Scripts

This is a collection of helpful command line scripts.

23.8.1 Determine list of LNOS services and their current state

in **Powershell**

```
Get-WmiObject -cn server1,server2,etc -Class win32_service | where({$_.DisplayName -match
"^(LNOS|DCF|NS)[$]|^FW([_](Optimizer|Scheduler)|BatchProcessor)"}) | select
PSComputerName,DisplayName,StartMode,State | sort PSComputerName,StartMode, State
```

to run against multiple servers add in the parameter highlighted above, otherwise **remove this parameter to run locally**

Example Output:

PSComputerName	DisplayName	StartMode	State
L00704	FWBatchProcessor	Auto	Running
L00704	LNOS$OptAsync Svc 1	Auto	Stopped
L00704	FW_Scheduler_LNOS_BGO-2	Disabled	Stopped
L00704	FW_Optimizer_LNOS_BGO-2	Disabled	Stopped
L00704	FW_Optimizer_LNOS_BGO-1	Disabled	Stopped
L00704	FW_Scheduler_LNOS_BGO-1	Disabled	Stopped

23.8.2 Determine non-paged pool memory for a server

in **Powershell**

```
gwmi -cn server1,server2,server3 -class win32_perfrawdata_perfOS_Memory | select
PSComputerName,PoolNonPagedBytes,AvailableMBytes
```

23.8.3 Enable X-forwarded-for in Windows 2012 R2 (IIS 8.5) or later

in **Powershell**

```
import-module WebAdministration

New-ItemProperty 'IIS:\Sites\Default Web Site' -Name logfile.customFields.collection -Value
@{logFieldName='OriginalIP';sourceType='RequestHeader';sourceName='X-FORWARDED-FOR'}
```

23.9 How a Party or Parties Can Be Used in Descartes Route Planner

Below is a description of how a Party or Parties can be used in Descartes Route Planner:

- A user can be assigned to multiple Parties.
- A user once assigned to a Party can only view data that has been assigned to that party.
- These Parties can be used to group Orders and Routes together.

- Order uses DocFWImport/Request/DocBOL/UDF/@PartyKey for adding Party.
- Order can also use DocFWImport/Request/DocBOL/@PartyKey for adding Party.
- Resource XML documents use DocFWImport/Request/DocResource/@PartyKey for adding Party.
- Party requires CtySysValue setting to be turned on to use.
- If the Party does not exist when a order is creation then it does not get added to the Order.
- If a User is not assigned to a party they can see everything.
- If a user is added to a party they can only view routes from that party.
- Orders will inherit the party from the Resource when the Order is assigned to a route.
- A user can be assigned to multiple parties.
- A User can not update an order that they are not party to, even via XML.
- Party's are linked to a User Group. Therefore only the users in the same User Group that setup the Party will be affected by the assignment Party.
  - If User Groups are added later this can cause issues as no party's would have been setup for these new groups.
  - Party's could be made global in a future release. Due to issues having to create multiple parties for the same carrier when one global party could be used.
- If a user without any party association edits an order with a party, the party is lost and when saved, that order loses its party. There was a tfs for this bug and not sure if completed in 14.2.2.14. (to be confirmed)
- You cannot update an Order with a different party via DocBOL on a Route. It must be first be unassigned from the Route. (to be confirmed)

23.10 What Are Textkeys?

The textkey is a way for the application to customize the text that is displayed to a user. If you go to customize your dashboard in 12.x or higher you will notice the name plus a "key" in brackets.

e.g. measure1 :: [@LBMeasure1]

@LBMeasure1 is the internal "key" for the text that is displayed. Each field on the page has a default text and should have a textkey associated with it.

When rendering the page for the user instead of displaying the default text it checks the FWTextKey table in the security database for a textkey, if one exists it then checks the FWText table (also in the sec db) it looks it up by language (langcode 1 = English) and then by level1id (organization #) it looks for records where the orgid=level1id or level1id = 0, if a level1id >0 is returned then it means there is an "org" override and it displays that text instead otherwise it uses the level1id=0 record for the language.

For performance reasons these textkeys are loaded once on startup of the application pool and are then cached, they are not reloaded unless an admin uses the /core/admintools page to flush cache and reload application or the application restarts (e.g. RestartCOM nightly restart).

The textkey can be customized using setup>text if logged in as an admin (except SSO environments) or as a "secadmin".

23.11 Mapping

Route planner supports a number of mapping technologies. Not all mapping technologies are available for all usages.

Two Digit Country Code Listing
http://en.wikipedia.org/wiki/ISO_3166-1_alpha-2#Decoding_table

Canadian / US Province / State Codes
http://www.canadapost.ca/tools/pg/manual/PGaddress-e.asp#1380608

These technologies can be used in one of 3 ways:

23.11.1   Geocoding

Q: What geocoding engines are available?
A: There are several geocoding engines available depending on the version
GCPI - uses "classic" LMB map files local on the server, score is either standard (2550-4500) or scaled (0-100)
Descartes AltaMap - in 13.1 it should be possible to geocode to a local GeoMicro server from RP directly.
DSG Geocoder Service - startin with 12.1 there is a webservice that can support multiple geocoding engines and provides the ability to use multiple sources at once and external websites.

Q: What engines can the DSG Geocoder service use?
A: The DSG Geocoder webservice has 2 types of engines, primary and fallback. The fallback engines are only used if the the primary engine returns a score less than **75**. The Fallback engines are single-threaded.

Primary Engines:
GCPI - not yet supported
Winroute - Descartes' geocoding engine used by our european Product Suite
Descartes AltaMap - Descartes' geocoding engine which now is also used for map display starting with 12.1

Fallback Engines:
Google™ - only available through the Descartes' Hosted DSG Geocoder service, this is a fallback geocoding engine only. this means it wil only be used when a Descartes' geocoding engine is unable to return a "good" score, the default threshold for this is 75, requests to Google are single-threaded per customer. Requires 12.1 or higher.
Microsoft® Bing® - only available through the Descartes' Hosted DSG Geocoder service, this is a fallback geocoding engine only. this means it wil only be used when a Descartes' geocoding engine is unable to return a "good" score, the default threshold for this is 75, requests to Google™ are single-threaded per customer. Requires 12.1 or higher.

Q: Can the DSG Geocoder service be hosted by the customer?
A: No, this is hosted by descartes only.

Q: Is there a cost to use the DSG Geocoder webservice?
A: Not directly however different external engines have costs associated with them.
 (e.g. for Google™ the cost is ~ $15-20/truck/year however this needs to be determined with the sales team).

Q: What is "good" score for GCPI
A: This is subjective but some general rules are:
4200 - very good
4000 - good
3800 - ok (very bad
< 3800 - bad

Special scores:
3500 - street/city/state match, but wrong zip this can be ignored Configure GCPI to Ignore ZIP or PC
2550 - zip only found
-100 - no geocode found

Q: What is a "good" score for DSG Geocoder webservice
A: This is subjective but some general rules are:
>= 77 - good
< 77 - bad
< 70 - very bad
-100 - no geocode found or service unavailable

23.11.2   Map Display

Q: What Engines are available for map display?
A: At present there are several free and licenseable engines. Because these display engines may use data sources they may not exactly align with the data being utilized for pathing (LMB or Descartes AltaMap) and/or Geocoding (LMB, DSG Geocoder).

Q: "Free" Engines:
A: Descartes AltaMap (included as part of the Descartes Route Planner licensing), requires a Descartes AltaMap map server
Open Maps
LMB

Q: "Paid" engines:
A: Google™
Microsoft® Bing®

23.11.3   Pathing

Descartes Route Planner supports two types of pathing:
LMB - Legacy maps supporting passenger and truck routing, no extended attributes
Descartes AltaMap - Future state maps supporting commercial pathing (Hazmat, Truck Dimensions, Traffic patterns, etc)
NOTE: see Enable Descartes AltaMap routing for further details on how to enable routing.

23.12 Descartes Route Planner API Queueing
Route planner queue optimization calls are single-threaded, to allow for more than one request simultaneously to the optimizer we can setup queue services for different operations and even multiple services for the same group of operations. Each service reads from a designated queue. It is impossible to predict which service will act on a request if there is more than one however each service can only work one queued request at a time.

The following table provides a summary of the more common operations going through each queue. This list is not definitive but provides a guide as to which operations involve which queues. If the queue is not enabled the task occurs in the component itself instead.

Task / Operations		Queues						
Group	Operation/API	Advise/ Adapi	Confirm	OptUI	Rmpi/Opt	OptDisp	GCPI	OptAsync
UI				X				
	Resequence			X				
	Reverse			X				
	drag/drop			X				
	Optimize All							X
	Optimize selected							X
	Unassign order			X				
	Edit Resource				X			
	Edit Order (on a route)				X			
Interface								
	Order Update				*1		X	
	Order Add (w/ preferred route)				*1		X	
	Order Delete				*1			
	Mobile Status (arrive, complete miss)				*2	X		
	Mobile GPS (only on AVL recalculate interval)				*3	X		
Other								
	BGO				*4			
	Batch Processor (RunOptTask)				X			
	Batch Processor (CheckAVLEvents)				X			
	Apply Master Route (UI/Batch Processor)			X				

NOTE:
X: executes through queue if queue is enabled
*1: Order operations with TaskName="UpdateRouteAsync" do not involve queue, this is handed over to the batch processor instead
*2: The RMPI queue is involved only when a route needs to be recalculated in the 3rd phase (** need to check with brian)
*3: GPS messages are normally just written to the database (optdisp) however if use avl is configured than after X messages have been received it will recalculate the route, this is configured under data>schedules>avl, this will go under RMPI/Opt queue.
*4: BGO only involves a queue when it runs into a profit mismatch and requests the route to be refreshed by LNOS. It will also use queue when in dispatch-bgo mode.

24 Application Customizations

24.1 Customize UI Login Screen Help

For customers that are non-hosted or for hosted customers that would prefer help tickets be routed to internal helpdesk first the login help can be customized. If a user is unable to login a custom warning can be displayed to the user. To configure this, use the DCF UI.

1. Navigate to http://localhost/DCF
2. Login as **Descartes Systems Group/SecAdmin**/cs
3. Navigate to **Setup > Organization** menu item
4. Right click the desired organization, choose **Web Contact Info**
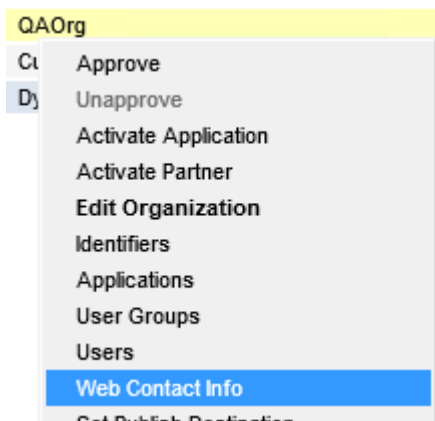
5. Provide customized helpdesk contact details (HTML Tags supported).
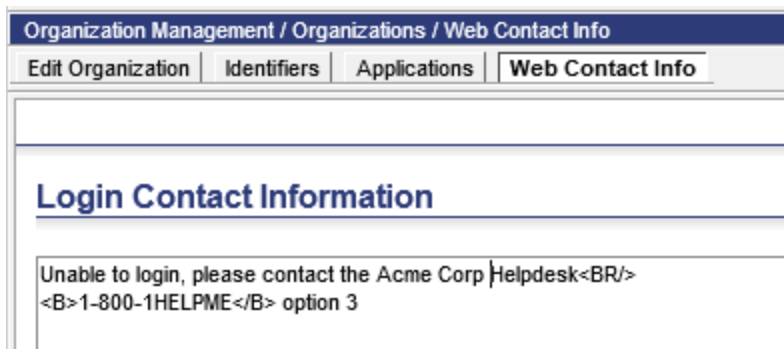
6. Click **Save**.

NOTE: If changed, the www service must be restarted or the UI cache flushed before it will take effect.

24.2 Customize the Manifest

Descartes Route Planner allows for manifests to be customized, this requires knowledge of both the DocRouteDetail XML and XSL transforms. When modifying the transform it is recommended that only one change be made at a time as there is no way to debug the transform outside the RP UI.

Note if the path is invalid or the XSL cannot be parsed the system will revert to the standard manifest, for this reason it is recommended to have something in the manifest to easily distinguish it from the standard manifest (instead of just content) to ensure that it is in fact using the custom manifest

To enable a custom manifest:
Login as the **SecAdmin** account ([org]-secadmin or fw-secadmin)
Navigate to **Setup>Profile Items**
perform a quick find for **Manifest**
Right click **FW_RouteManifestXSL** and choose **Add Org Item**
Configure the **fully qualified filename** to the custom manifest.
e.g. e:\inetpub\wwwroot\LNOSFWUI\XSL\Form-RouteManifest_Acme.xsl
Click Save

To test a custom manifest:
Log in with a normal RP account (e.g. FW-admin)
Right click a route and choose **View Route Manifest** or **Print All Manifests**

To customize the manifest:
The standard manifest uses a different document structure than the custom manifest, the standard manifest is written in such a way it should support either document type but it is possible some columns will stop working as a custom manifest that worked as a standard manifest.
To investigate how to map a field generate a UI trace and review the GetDocRouteDetail external command to see the route document(s) used generate the manifest document.
See UI Tracing for more details

24.3 Using Custom Icons

A set of custom icons can be added to the dashboard and the route/stop icons on the map can be modified throught he use of custom icons.

Custom icons have 2 parts, a "mapping" and a "profile" which is a group of mappings. For each quadrant and quadrant level a different mapping must be created, this means to show the same icon in unassigned stops, route detail and the map requires 3 separate mappings, each profile can contain a single mapping per quadrant/level combination.

Some common uses of custom icons:

- Stop (usually map and quadrants):
    - identify orders with variable profit (must go vs nice to go)
    - identify orders with different requirements (liftgate vs flatbed)
    - identify emergencies
    - identify different class of customers
- Route (usually not on map):

       o   identify route elapsed duration to quickly identify routes nearly out of hours
       o   identify routes with high miles (projected distance)
       o   identify different vehicle types (liftgate vs flatbed)

You can also do more than one use at a time by using shapes to designate one requirement and colour to do another e.g. small truck = triangle, regular truck = circle, large truck = square, low profit = green, medium profit = yellow, high profit = red.

The mechanics of how to do this customization can be found in the RP user/admin guide.

Once the profiles are created they can be selected by a user from **data filters>options** or by right clicking the map and choose "**show by custom icon**". You can turn them off by choosing "**hide by custom icon**".

24.4 Customize Labels Globally(TextKey)

Columns can be renamed on the dashboard by customizing the quadrant however this only changes it for that quadrant, in some cases there is a desire to rename a field globally so it affects the "filter" screens, edit resource/order/location screens, etc.

This can be done by customizing the textkeys. The textkey can be quickly identified in most cases via the "customize" dashboard screen.

For example:

- Open a quadrant
- click **Customize** button
- click **Wrench** beside the appropriate line
- in the left is a list of all fields available
- drag the field to rename to the right screen
- in this screen there is the current value followed by something like ::: [@**LBFWOrderUDFString6**]
- The value **after the @** symbol is the **textkey**

To customize the textkey:

- Login as secadmin (e.g. Acme/fw-secadmin/cs or Acme/Acme-secadmin/cs, depending on install type)
- Navigate to **Setup>Text**
- You will be prompted for 2 languages
  - o **Edit Language** = Language you want to modify
  - o **Reference Language** = Language you want to use as a reference we making the edit
    - ▪ This is useful if modifying translations
- You then can choose a category, most of the text to be renamed in RP are labels (optional)
- Finally you can provide a filter to limit the options returned (there are thousands), either put in the full or partial textkey
- Right click the textkey to edit and choose "add text"
- Provide your alternative text, click "Save"

Once finished all textkeys they will not take effect until the next recycle of the application pool. They can also be forced by doing a flush cache, reload application from the /core/admintools page or restarting the WWW service.

24.5 Customize Skin (Logo or Colors) of the UI

Descartes Route Planner allows the UI to be "skinned" which allows the logo in the header to be changed and the colours to be modified, it comes with several "standard" skins which can be copied and modified as needed.

The default skins can be found in:
C:\inetpub\wwwroot\LNOSFWUI\Core\Skins\Default

Note: these are replaced with every install

The skin has 4 parts:

1. Large Logo (GIF)
2. Small Logo (GIF)
3. Style sheet (CSS file)
4. Thumbnail - for when choosing skins (jpg)

There is also an XML file, which contains the list of profiles available, what folder they are in and an alternative (optional) label.

a user can select a skin by going to **User Profile>Color Scheme**

By copying an existing one and either editing the file (CSS) or replacing the files (GIF/JPG) with an alternate the UI can be customized.

The custom skins should be placed into the following folder:

C:\inetpub\wwwroot\LNOSFWUI\Skins\[orgname]

Where [orgname] is the name used during login to the UI. And the XML file should be updated if a folder is added/removed.

24.6 Customize RP Keywizards

Key Wizards are used to control Automatic Key Generation for Order and Resource.

DATES
Date formats can be controlled using formats similar to these examples:
%Y-%m-%d = YYYY-mm-dd = 2030-10-28
%y-%m-%d = yy-mm-dd = 30-10-28

The complete list of date format's can be found below:

```
%a        Abbreviated weekday name
%A        Full weekday name
%b        Abbreviated month name
%B        Full month name
%c        Date and time representation appropriate for locale
%d        Day of month as decimal number (01 ? 31)
%H        Hour in 24-hour format (00 ? 23)
```

```
%I          Hour in 12-hour format (01 ? 12)
%j          Day of year as decimal number (001 ? 366)
%m          Month as decimal number (01 ? 12)
%M          Minute as decimal number (00 ? 59)
%p          Current locale's A.M./P.M. indicator for 12-hour clock
%S          Second as decimal number (00 ? 59)
%U          Week of year as decimal number, with Sunday as first day of week (00 ? 53)
%w          Weekday as decimal number (0 ? 6; Sunday is 0)
%W          Week of year as decimal number, with Monday as first day of week (00 ? 53)
%x          Date representation for current locale
%X          Time representation for current locale
%y          Year without century, as decimal number (00 ? 99)
%Y          Year with century, as decimal number
%z
%Z          Either the time-zone name or time zone abbreviation, depending on registry
settings; no characters if time zone is unknown
%%          Percent sign
```

24.7 Config.xml Options

This wiki page will give an overview of the possible entries in the GeneratedFiles\Config.xml and its use.
Also available via http://localhost/lnosfwui/core/admintools (click on application variables)

Attribute	Value	Description
DisableRememberMe	TRUE or FALSE	This is used to suppress the Remember Me checkbox on the login page. If it is set to TRUE then the Remember Me checkbox on the LNOS Login page willl be hidden
SMTPServer	String	SMTP server address
EnableSSO	TRUE or FALSE	Enable single-sign on integrated Navplan between multiple LNOS applicatons (not to be confused with ADFS SSO).
SessionSQLDataSource	String	Specifies sql server Details used to store session information. If SSO is enabled this is required, this is also required if using a load balancer.
SessionSQLDatabase	string	
SessionSQLUserID	string	
SessionSQLPassword	string	
RegularScriptTimeout	Integer	
FEDebugMode	true or false	
SessionTimeOut	Integer	This is the session time out setting i.e. how long of an inactivity before the system logs you out, default is 30 minutes
UseSingleDriver	true or false	disables the crew pages
SysAdminUser	string	pipe delimited list of users [org]\[user] format that should be created the UIF tools menu.

24.8 Deploying LMB Map Edits

First changes have to be made to the maps using the RIMMS application. After this the files have to be deployed to all Descartes Route Planner servers.

Step 1 – Make changes to the map with the RIMMS application
Open RIMMS through the Start menu. Starting the RIMMS exe needs to include the RIMMS.ini. Typically in the Samples folder.
Click the Globe icon if incorrect map is displayed at the top click Ctrl+N or Ctrl+P to switch maps.
Press Ctrl+G
Type in an address near the road you want
Press enter twice to jump to that location

Locate a road
Navigate via:
Ctrl+I = Zoom In
Ctrl+O = Zoom Out
F4 = Jump to selected

Modify a Road (close road)
Click road segment starting point for closure
Press F7 to start road edit
Click on destination
Press Ctrl+M to edit the road
Make the desired change and click "OK"

Modify a Road (re-open road)
Click road segment starting point of an existing map edit
Press F7 to start road edit
Click on ending point of the existing map edit
Press Ctrl+E to remove the map edit

Verify Map Edits
To verify the map edit you can have RIMMS drive between 2 markers. The routing rules are control the routing parameters (Edit>Routing Parameters).
As an example to turn on commercial restrictions, edit the "DEFAULTS" routing parameter, go to the "other" tab and uncheck "Allow non-commercial only roads".

To have RIMMS route between 2 markers click on the map at the origin, click F7. Then click on the destination. Pressing F8 will rout between these markers.
The markers can be swapped by pressing F7, you can then re-route by pressing F8 again. This is useful to test bridges, highways or one-way road edits.

Step 2 – Deploy Map Edits to Descartes Route Planner
The map edit files are created in the RIMMS\Samples folder and have a lme/lpe extension, the filename will be the name of the map that was edited. Make sure to close the RIMMS application before moving the lme/lpe files.

This script performs the following actions:
 - Use RestartCOM to stop all services
 - For the following Queue folders:
     [drive]:\lnos\fleetwise\cache
     [drive]:\lnos\fleetwise\cache\[queuefolder]
 - Delete all files (to remove any caching)
 - Re-copy all map edit files
 - For the BGO folders:
     [drive]:\lnos\fleetwise\scheduler\[instance]\temp

 - Delete all files (to remove any caching)
 - Re-copy all map edit files
 - Use RestartCOM to start all services

Steps:
- Move the lme/lpe files to a new directory (for example MapEditFiles). Placing the lme/lpe files on a share drive helps for any future changes.
- Add with the lme/lpe files an changelog.txt with some details on the changes made to the files. This file will be deployed together with the map edit files.
- Check the details of the DeployRoadEdit.cmd to ensure that it is pointing to the right drive (standard e:), Make required changes.
- In the command prompt trigger the process with the DeployRoadEdit.cmd followed by the directory that contains the lme/lpe files [D:\MapEdits> DeployRoadEdit.cmd D:\MapEdits\MapEditFiles]
- The script has to be executed on all servers.

- Validate if the changes have been deployed correctly; use the calculate distance option across the area that is closed or modified.

25 Utilities

25.1 BareGrep IIS Parsing

BareGrep is a utility that quickly parses text log files and can utilize "regular expressions" to extract relevant records only.

to use the utility:

- extract the utility on the server (recommend in the lnos\bin folder)
- go to preferences, load from file and select the .udm file (included in the zip)
- update the path and filename to point to the IIS path/log files
    - On Windows® 2003 these are typically located at c:\windows\system32\logfiles\w3svc1
    - On Windows® 2008 these are typically located at c:\inetpub\logs\logfiles\w3svc1
- Then choose one of the filters I've already created from the dropdown.
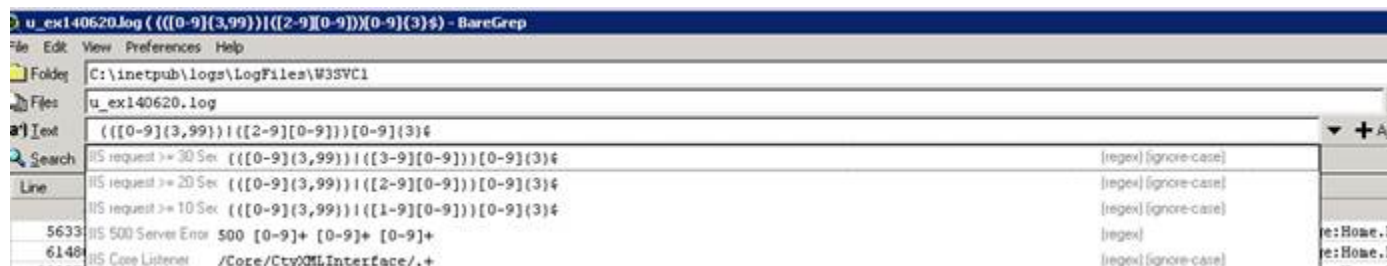
You can also scan multiple files in this manner. Just use wildcards in the files list or use regex syntax (click checkbox beside files input box) and use the appropriate format.

As a tip for regex file searching:
U_ex14062[2-4].log
Will find log files for june 22-24 ([2-4]) using square brackets and a range allow you to quickly include a limited number of files rather than a wildcard like (*) which would also include june 20,21,25,26,…

It will immediately start trying to match, it is very fast.

25.2 RAMMAP

26 Customer Support Portal

The Descartes customer portal can be used to exchange files with Descartes.
https://www.myvan.descartes.com/CustomerSupport/Access/Upload.aspx

Each user requires his or her own credentials; these credentials can be obtained through Descartes support by your Project Manager.

Choose **DeliveryManagementSuite** from the expertise center dropdown.

It is recommended to email Descartes support a screenshot of the completed upload to avoid ambiguity in the file received (servicedesk@descartes.com or sdresponse@descartes.com if it is related to an existing ticket). If working with specific individuals at Descartes, please CC them in the email trail.

In the ticket field please provide a DSG incident # or an individual's name at Descartes or a description of the problem to help identify the file uploaded.

27 Document Management

27.1 Document Control Table

Version	Date	Author	Comment
1.0		Justin Marshall	Initial Draft
1.1	12/08/2014	Kjartan Ouwerkerk	Updated to include new articles and updated to Descartes' document template.
1.17	01/07/2015	Justin Marshall	Final Edits and formatting changes.
1.18	10/13/2015	Justin Marshall	Update with latest KB changes
1.19	10/19/2015	Justin Marshall	Added addition command failure messages, moved command failure to level 1. Resized some pictures. Added RP Queueing FAQ