Using hp OpenView Omniback II GUI Via Slow Remote Connections
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1. Introduction

With Omniback II version A 04.00 a new GUI was introduced. Using this GUI via slow remote connection with conjunction of X windows software may result in worse performance compared to version A 03.50. The main goal of this document is to address this issue.

This Whitepaper describes different approaches on how to use the Omniback II GUI via a slow dial up connection. In case the native GUI, available on HP-UX, Sun Solaris, Windows NT, Windows 2000 and Windows XP can’t be used, the so called X emulation programs are used on Windows platforms to enable a connection to the Unix system where Omniback II is running.

There are two different kind of emulation software. One type consists only of client software, which implements an X server (X is a generic name for the X Window System display server). On Unix machines there is no additional software necessary since the X server, running on the Windows system, communicates via the X protocol directly with the X application on the Unix machine. The second type of emulation program requires software on both. On the Unix machine a X server is running, which communicates with the X application, and on the Windows system a special client software enables the connection to the X server on the Unix machine. The communication is based on a proprietary standard.

When an Omniback II GUI is started, based on such emulation programs in conjunction with a slow remote network connection, there are performance differences between these two kinds of emulation software. This whitepaper describes the concepts of these two different kinds of emulation software and explains what formulates the distinctions.

Additionally, it explains how to use the native GUI, including the command line, which achieves the lowest data flow over the network and therefore the best performance.

This whitepaper is based on Omniback II A.04.10 and Data Protector A.05.00.
2. Omniback II GUI changes from 3.x to 4.x

With Omniback II A.03.xx, two different GUI were available; one for HP-UX as a Motif GUI and the other for Windows platforms. Although, nearly identical functionality was available in both GUIs, the handling and look & feel were totally different.

With version A.04.00, Omniback II introduced a new GUI on HP-UX, which is consistent to the one on Windows platform. This new GUI has the same look & feel, menu structure and dialogs as the Windows GUI. The great advantage is that users have the same user interface regardless of what platform they use.

To get this cross platform consistent GUI, the GUI running on Windows was ported to HP-UX. This was done using the tool Wind/U of Bristol Technology. Wind/U mainly consists of libraries that implement the Microsoft Win32 API, including features such as MFC (Microsoft Foundation Class), ActiveX, and COM on major UNIX platforms. This allows that code, which was written for Windows environments, can be compiled and executed on major UNIX platforms.

Please note that Wind/U is not a virtual machine, which simulates a PC. Wind/U allows to compile Windows Code and produces native Unix binary code, which then can be executed on the corresponding Unix machine.

Figure 2-1 Building blocks of the Omniback II GUI
3. Using Omniback II GUI via Dial up connection

When working with Omniback II, it is recommended to install an Omniback II GUI locally on the system. In case of a slow dial up connection or in case that only an ASCII connection can be established, it is recommend to use the command line interface. The best network performance can be achieved with a locally installed GUI/CLI.

If the so-called X emulation programs are used then the setup must also be adjusted to suit Omniback II requirements to achieve an acceptable performance via slow remote connections, for example a 56kbs modem connection.

The startup time of the Omniback II 4.x GUI can be very slow, dependent of the used X windows program. It can last up to 1 hour, for detailed numbers see chapter 4. With Data Protector 5.0 the startup time over slow remote connections is decreased dramatically, so all X windows emulation program achieves acceptable results (up to 4 minutes). To get similar performance values also for Omniback II 4.1 the patch SSPUX410_054 must be installed.

3.1. Using native Omniback II GUI and command line

Omniback II offers a GUI for HP-UX, Sun Solaris and Windows platforms (NT, 2000, XP). It can be installed locally or also remotely by the Installation Server. The Omniback II GUI doesn’t require additional licenses. Please refer to the Omniback II installation manuals.

In addition to the graphical user interface, Omniback II also offers a command line interface. Especially, for very slow remote connections it is recommended to use the command line interface, since it reduces the network traffic to a minimum.

All functionality is available via the command line interface. For a complete description please refer to the Omniback II documentation. Please see below for an overview of commands to start, monitor and stop a backup sessions.

### start a backup

<table>
<thead>
<tr>
<th>filesystem</th>
<th>omnib -datalist &lt;backup specification name&gt; [additional options]</th>
</tr>
</thead>
<tbody>
<tr>
<td>oracle 8</td>
<td>omnib -oracle8_list &lt;backup specification name&gt; [additional options]</td>
</tr>
<tr>
<td>sap</td>
<td>omnib –sap_list &lt;backup specification name&gt; [additional options]</td>
</tr>
</tbody>
</table>

### start a restore

| filesystem | omnir -filesystem <system name>:<mountpoint> "<label>" -session |

- 5 -
3.2. Using emulation programs based on X window

If the local Omniback II GUI can’t be used and if there is a need to have an Omniback II GUI still available, then so called X-windows programs can be used to share windows of an X application from a Unix to a Windows system. Tools like Reflection X and Exceed provide such functionality.

Figure 3-1 illustrates the concept: such software, also called PC X server, manages visual display on a Windows system, which comes from a X client application program. The X server conveys user input information, such as the click of the mouse or a keystroke, to the appropriate client application. Client applications communicate their display requests to the X server. The X server and client application can reside on the same computer or on different computers connected by a network.
As showed in Figure 3-1 the X server running on Windows system communicates to the X application (Omniback II GUI) via the X protocol. As described in chapter 2, the Omniback II GUI running on Unix is not a real native Motif GUI, since Windows NT/2000 code together with Wind/U is used to create native HP-UX code. Wind/U is based on Microsoft technology and doesn’t follow the X protocol standard. This limitation has an impact on the network load: although it works the resulting network load is high and therefore, such a setup can’t be recommended for a slow remote connection. The main reason for this high network load is that Wind/U components are basically implemented as extended MOTIF controls.

Other emulation programs that don’t use the X protocol to send data via a slow remote connection, like Exceed onDemand or VNC don’t have this limitation. They achieve a good and acceptable performance via slow network connections. The next chapter will describe those configurations in detail.

3.3. Using emulation programs based on a two tiered PC X server architecture

This chapter describes another approach of sharing a Unix GUI on a PC. The biggest difference is that the communication over the slow remote connection is not done via the X protocol. Due to proprietary, highly optimized protocols those program achieve acceptable performance result when sharing the Omniback II GUI via slow remote connections. The two programs Exceed onDemand and VNC are described below.
3.3.1. Exceed onDemand

This program consists of an X Server and an Exceed onDemand client. The X server is running on the Unix system. This has the advantage that the communication with the X application (Omniback II GUI) is done within the LAN. The communication between the X server and the Exceed onDemand client is done via the slow dial up connection. The following figure shows the configuration setup.

**Figure 3-2 Exceed onDemand Configuration setup**

The key differentiator is that both the X application and the X server could run on the same system. The X server (Exceed onDemand server) can also be used for other Unix systems connected to the LAN. This results into the fact that the exchange of information via the X protocol is done either locally or within the LAN. Please see the Exceed onDemand documentation for more information. The communication across the slow remote connections is done via the Thin X protocol, which is highly optimized for slow remote-connections.
3.3.2. VNC

VNC stands for Virtual Network Computing. It is, in essence, a remote display system which allows you to view a computing 'desktop' environment not only on the machine where it is running, but from anywhere on the Internet and from a wide variety of machine architectures.

The VNC protocol is a simple protocol for remote access to graphical user interfaces. It operates over any reliable transport such as TCP/IP. It is truly a “thin-client” protocol: it has been designed to make very few requirements of the viewer. The Figure 3-3 shows how VNC is setup and works. VNC Server software must be installed on the Unix system while VNC viewer is necessary on the client side.

Figure 3-3 VNC configuration setup

The VNC Server software Xvnc is based on a standard X server. Applications can display themselves on it as if it were a normal X display, but they will actually appear on any connected VNC viewers rather on a physical screen. Therefore Xvnc is two servers in one: To the applications it acts like an X server, and like a VNC server to the remote VNC users. By convention, the VNC server display number will be identical to the X server display number, which implies e.g., host1:2 will refer to display 2 on machine host1 in both the X world and the VNC world.
VNC is free and can be downloaded, used and redistributed under the terms of the GNU Public License. Both binaries and source code are available from the following site:

3.4. Monitoring session

If the current sessions are monitored and the GUI is running over a slow remote connection it is recommended to change the default refresh rate from 5 seconds to a higher value. This reduces the network traffic. The value can be changed under File->Preferences -> Monitor -> Refresh interval. This value affects only the screen where the current sessions are shown.

If the detailed information (backup objects, backup device, message) is shown in the GUI and the GUI is connected to the Cell Manager via a slow remote connection, then such a setup can influence the backup performance. In case the detailed information is shown in the GUI a direct socket connection is established with the Cell Manager. A process running on the Cell Manager (backup session manager) is responsible to update all connected GUIs with the latest information, which was sent from the backup system (media agent). In case it takes very long to transmit all new data to the GUI, then this can influence the backup performance in total. Therefore it is recommended to see the detail information of a session only if it is needed and to change to context within the GUI when the detailed session information is not required.
4. Performance Tests

This chapter presents performance test results of the Omniback II / Data Protector GUI that is shared via slow remote connections with X window programs. Four different tools were part of these tests: Reflection X, Exceed, Exceed onDemand and VNC.

4.1. Test environment

4.1.1. System configuration

| Unix System | HP-UX 11.00; 256Mbyte RAM |
| Windows System | Windows NT 4.0; Service Pack 5; 192 Mbyte RAM |

4.1.2. Network configuration

Two different software was used for the connection via the telephone line. First with PAL a network connection was established. Second the Extranet software was used to connect to the Intranet via the firewall. The following table describes the used software in detail:

| PAL | Phone Assist Lookup v4.1 |
| Extranet | Extranet Access client V02_62_47 |
| Security: ESP Triple DES, SHA |
| Compression: LZS Compression |
4.1.3. Configuration of the X Windows software

**Exceed**
- X server tune-up performed (at the end of the installation)
- version 7.1.0.0

**Exceed onDemand**
- Client: version 3.2
- Server: version 3.2 (without SSL)
- Patch 3.2.0.6 installed
  (used optimal settings according to the patch description)

**Reflection X**
- Version 6.2

**VNC**
- Client version 3.3.3

4.1.4. Configuration of Omniback II / Data Protector

**Omniback II 4.1**
- HP OpenView OmniBack II A.04.10
- installed patches:
  - PHSS_25963 1.0 OV OB4.10 patch - CS packet
  - PHSS_25965 1.0 OV OB4.10 patch - CORE packet
  - PHSS_26220 1.0 OV OB4.10 patch - MA packet
  - PHSS_26342 1.0 OV OB4.10 patch - CC packet
  - PHSS_26344 1.0 OV OB4.10 patch - DA packet

**Omniback II 4.1 * **
- HP OpenView OmniBack II A.04.10
- installed patches:
  - PHSS_25963 1.0 OV OB4.10 patch - CS packet
  - PHSS_25965 1.0 OV OB4.10 patch - CORE packet
  - PHSS_26220 1.0 OV OB4.10 patch - MA packet
  - PHSS_26342 1.0 OV OB4.10 patch - CC packet
  - PHSS_26344 1.0 OV OB4.10 patch - DA packet
  - SSPUX410_054

**Data Protector 5.0**
- HP OpenView Storage Data Protector Beta version A.05.00
  (Internal build version 172)
4.2. Test results

The numbers are given in "minutes: seconds". The small numbers in brackets show the used bandwidth in kbit/s.

<table>
<thead>
<tr>
<th></th>
<th>VNC</th>
<th>Exceed onDemand</th>
<th>Reflection X</th>
<th>Exceed local GUI</th>
</tr>
</thead>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
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<td>59:45 (46,6)</td>
<td>37:02 (42,6)</td>
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<td>51:29 (46,6)</td>
<td>42:43 (37,0)</td>
</tr>
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<td>37:15 (44,0)</td>
<td>33:00 (46,6)</td>
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<td>34:41 (46,6)</td>
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<td>4:37 (44,0)</td>
<td>5:20 (44,1)</td>
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<td>4:36 (44,1)</td>
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<td></td>
<td></td>
<td></td>
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<td>3:08 (42,6)</td>
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<td></td>
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<td><strong>switch context</strong></td>
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<td>4.1</td>
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<td>2:05 (41,3)</td>
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<td></td>
<td></td>
<td>2:00 (41,3)</td>
<td>0:03</td>
</tr>
<tr>
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<td>0:03</td>
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<td><strong>start / stop backup</strong></td>
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<td></td>
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<td>4:02 (44,0)</td>
<td>3:25 (41,3)</td>
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<tr>
<td></td>
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<td>0:15</td>
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<tr>
<td><strong>reconnect</strong></td>
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<tr>
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<td>4.1</td>
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<td>3:51 (42,6)</td>
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<td>4:13 (44,0)</td>
<td>0:04</td>
</tr>
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<td>0:40 (44,0)</td>
<td>3:15 (44,0)</td>
<td>2:44 (42,0)</td>
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<td>6:10 (41,3)</td>
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<td>5:55 (41,3)</td>
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<td>3:00 (41,3)</td>
</tr>
<tr>
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<td>0:35 (44,0)</td>
<td>2:14 (42,6)</td>
</tr>
<tr>
<td></td>
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<td>2:26 (46,6)</td>
<td>0:04</td>
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<td></td>
<td></td>
<td></td>
<td>3:02 (44,0)</td>
<td>0:04</td>
</tr>
</tbody>
</table>
NOTE: For some actions the numbers are deviating. Mostly the reason for this difference is whether this action was performed for the first time (high value) or for a second time (low value).
### 4.2.1. Explanations of the tasks

<table>
<thead>
<tr>
<th>Task</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>startup time</strong></td>
<td>time measured after executing command <code>xomni</code> and pressing the OK button of the windows “Event log contains new or unread messages. These messages can be ….”</td>
</tr>
</tbody>
</table>
| **switch context**  | context is *Clients*  
                        | action:  
                        | - switch context to *Internal Database* |
| **start backup**    | A file with the size of 2,7 Mbytes is backed up. As a backup device a file device was used.  
                        | actions:  
                        | - select backup specification and press right mouse button -> start backup  
                        | - screen *Start Backup* pops up, press OK  
                        | - screen *Session completed successfully* pops up, press OK |
| **changing preferences** | context is *Internal Database*  
                        | actions:  
                        | - open Windows -> File -> Preferences  
                        | - go to *Monitor*  
                        | - change refresh value to 60  
                        | - press OK |
| **reconnect**       | actions:  
                        | - press reconnect button  
                        | - screen *Connect to a Cell Manager* pops up, press OK  
                        | - screen *Event log contains …* pops up, press OK |
5. Conclusion

To get the best performance over slow remote connections it is recommend to use a locally installed GUI or command line interface. If an X server program is used then it is very important to prevent that the X server protocol is responsible to share the Omniback II GUI over a slow remote connection. Software like Exceed onDemand or VNC offer an optimized protocol for those cases and achieves acceptable performance results.

The startup time for the Omniback II 4.x GUI (without SSPUX410_054) over slow remote connections can be very long (up to 1 hour). Up of the four tested X windows programs only one (VNC) achieved acceptable results (up to 1 minute). With Data Protector 5.0 the startup time was highly decreased and results in acceptable startup times (up to 3 minutes) independently of the used X windows program.

Using Omniback II 4.x with SSPUX410_054 the startup time has improved for all used X windows programs and nearly the same performance values as for Data Protector 5.0 are reached.
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