Server and Client Considerations and Recommendations

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eXactACCESS® Technical Environment

eXactACCESS ("XA") supports a wide variety of technical environments. This document provides the software, hardware, and configuration requirements for the more common XA environments. It is intended as a guide.

Please review this document and contact your HealthCast Project Manager if you have any questions about the considerations and configurations outlined below. Please note that these are not the only options that are supported; XA has been successfully deployed in many complicated environments, including those with multiple data centers that serve organizations across varying geographic time zones. Your HealthCast Project Manager can give you more information regarding how XA will optimally integrate into your technical environment.

**XA Server Considerations**

The following server considerations assume an environment with the following four elements:

- Up to 5,000 workstations
- Both XA Servers are located in a single data center
- Active Directory Windows 2008, or 2012
- A Load Balanced environment

If you plan to deploy to more than 5,000 workstations, or you have multiple physical locations or data centers, please ask your HealthCast Project Manager for information regarding additional configuration options.

**Server Hardware & Software Requirements**

This is the minimum hardware/software that will be needed for a successful XA implementation. **Two (2) physical servers should be dedicated for XA use.** If you are interested in using a virtual XA Server environment, please see the Virtual XA Server Environment Considerations section below.

<table>
<thead>
<tr>
<th></th>
<th>Primary Software Required 64-Bit Platforms</th>
<th>Hardware Specifications</th>
<th>Configuration Requirements</th>
</tr>
</thead>
</table>
| **First XA Server** | Microsoft Windows 2012 Standard Edition or Microsoft Windows 2008 R2 or SP2 Standard¹ (minimum)  
Microsoft SQL Server 2005 SP4 (all editions) or Microsoft SQL Server 2008 (all editions) or Microsoft SQL Server 2012 (all editions) or Microsoft SQL Server 2014 (all editions)  
XA Server Installation | 6 processor cores (8 recommended)  
4 GB RAM (MIN) (8 GB RAM recommended)  
2 Ethernet Network Interface Cards | **On the 1st XA Server, the SQL Server instance is active and requires a single SQL Server license based on the number of sockets, not cores.**  
Replication for SQL Server  
Microsoft Network Load Balancing Service (NLBS) |
| **Second XA Server** | Same as Above | Same as Above | **On the 2nd XA Server, the SQL server instance is only active when the SQL server instance on the 1st XA Server goes down. Because of its inactive state, no SQL Server license is necessary for the 2nd XA server.**  
Replication and Load Balancing are the same as above. |

¹ A full installation is required. Server Core installation is not supported.

**XA Workstation Considerations**
Minimum requirements for workstations differ depending on the XA Mode you are interested in deploying and the type of workstation (thick or thin client) that you currently have in production. If you are interested in using a virtual desktop infrastructure, the VM requirements are equivalent to the physical workstation requirements listed below. HealthCast supports both VMware and Citrix XenDesktop VDI infrastructures.

**Workstation Hardware & Software Minimum Requirements**

<table>
<thead>
<tr>
<th>Workstation Type</th>
<th>XA Mode Options</th>
<th>OS Requirement</th>
<th>Other Supported Software</th>
<th>Hardware Minimum Specifications</th>
</tr>
</thead>
<tbody>
<tr>
<td>Thick Client</td>
<td>Kiosk Mode (“KM”)</td>
<td>Windows 7 (32-bit or 64-bit)</td>
<td>Internet Explorer (IE) 7-11</td>
<td>Pentium 4 / 1.8 GHz processor (min) Dual-Core for Windows 7 (recommended) Windows 7, 8.1,10 32-bit – 2 GB RAM (min), 3 GB (recommended) Windows 7,8.1,10 64-bit – 3 GB RAM (min), 4 GB (recommended)</td>
</tr>
<tr>
<td></td>
<td>Standard User Mode (“SUM”)</td>
<td>Windows 7 (32-bit or 64-bit) .Net Framework 4.5.1</td>
<td>Internet Explorer (IE) 7-11</td>
<td>Pentium 4 / 1.8 GHz processor (min) 1 GB RAM (min), 2 GB (recommended) 800 X 600 display resolution, 32-bit color</td>
</tr>
<tr>
<td>Thin Client</td>
<td>Kiosk Mode (“KM”)</td>
<td>WES 7 (32-bit or 64-bit) Windows IoT Enterprise² (32-bit or 64-bit) .Net Framework 4.5.1</td>
<td>Internet Explorer (IE) 7-11³</td>
<td>300mb available drive space 32-bit 1 GB System RAM 64-bit 2 GB System RAM 800 X 600 display resolution, 32-bit color</td>
</tr>
</tbody>
</table>

1 Windows 8.1 requires specific policies to be applied to the generic user account for proper operation. Contact your HealthCast Project Manager for additional details.

2 Windows IoT Enterprise is the successor to Windows Embedded Standard (WES) - only Enterprise is supported. Mobile, Mobile Enterprise, IoT Core and Core Pro are not supported.

3 Microsoft Edge is not supported on Windows 10. Windows 10 includes Internet Explorer 11 which remains compatible.
**XA Microsoft or Citrix Remote Desktop Considerations**

If you are interested in deploying XA with Microsoft WTS/RDS or Citrix for roaming functionality, you should be aware of the following **minimum requirements**.

This server configuration is required in addition to the **XA Technical Environment** previously described. Hardware that is currently in your environment and fits the requirements specified can be utilized.

**Server Hardware & Software Requirements**

<table>
<thead>
<tr>
<th>Type of Server</th>
<th>Primary Software Required 32-bit and 64-bit Platforms</th>
<th>Scaling Requirements and Hardware Specifications</th>
</tr>
</thead>
</table>
| **Microsoft WTS/RDS** | Windows 2008 SP2/R2 Standard Edition\(^1\)  
Windows 2012/R2 Standard Edition\(^1\)  
XA Roaming Sessions Mode (“RSM“)\(^4\) | Microsoft Terminal Server [http://www.microsoft.com](http://www.microsoft.com) for scaling  
75 MB minimum RAM per session (up to 3 Wrappers\(^2\))  
Add 10 MB RAM for each additional Wrapper per session |
| **Citrix** | Windows 2008 SP2/R2 Remote Desktop\(^1\)  
Citrix XenApp Server 5.0, 6.x, 7.1  
Windows 2012/R2 Remote Desktop\(^1\)  
Citrix XenApp Server 5.0, 6.x, 7.1, and 7.6\(^3\)  
XA Roaming Sessions Mode (“RSM“)\(^4\) | Microsoft Terminal Server [http://www.microsoft.com](http://www.microsoft.com) for scaling  
Citrix server [http://www.citrix.com](http://www.citrix.com) for scaling  
75 MB minimum RAM per session (up to 3 Wrappers\(^2\))  
Add 10 MB RAM for each additional Wrapper per session |

\(^1\) *Terminal Services role must be pre-installed and a full installation is required. Server Core installation is not supported. Other Windows 2008 Standard edition pre-installation requirements include: SP2—Terminal Services, IIS, and TS Web must be pre-installed. R2—Remote Desktop Services, IIS, and Remote Desktop Web must be pre-installed.*

\(^2\) *This is an estimate based on the average size of a Wrapper. Larger Wrappers may require more space. This RAM estimate includes XA Wrapper size only; it does not account for the size of the application which the Wrapper integrates into XA.*

\(^3\) *Client connection options vary by device and operating system. Consult your HealthCast Project Manager to be sure the end point device configuration you are considering support the desired workflow requirements.*

\(^4\) *This environment can also be hosted in Virtual machines with supported Host operating systems (VMware ESXi 5.5 through 6.x, as well as Microsoft Hyper-V 2012 R2)*
XA VMware or Citrix Considerations

If you are interested in deploying XA in a VDI deployment scenario, you should be aware of the following minimum requirements.

This desktop configuration is required in addition to the XA Technical Environment previously described for Standard User Mode. Hardware that is currently in your environment and fits the requirements specified can be utilized.

Server Hardware & Software Requirements

<table>
<thead>
<tr>
<th>Type of Host Server</th>
<th>Primary Software Required 32-bit and 64-bit Platforms</th>
<th>Scaling Requirements and Hardware Specifications</th>
</tr>
</thead>
</table>
| VMware, ESXi 5.5x and 6.x | Windows 7 – 32-bit Windows 7 – 64-bit XA VDI Mode (“VMWAREVDI”) | For each virtual desktop:  
Pentium 4 / 1.8 GHz processor (min) Dual-Core for Windows 7 (recommended)  
Windows 7 32-bit – 2 GB RAM (min), 3 GB (recommended)  
Windows 7 64-bit – 3 GB RAM (min), 4 GB (recommended) |
| Citrix XenDesktop 5.6¹, 7.1¹, and 7.6¹ | Windows 7 – 32-bit Windows 7 – 64-bit XA VDI Mode (“CITRIXVDI”) | For each virtual desktop:  
Pentium 4 / 1.8 GHz processor (min) Dual-Core for Windows 7 (recommended)  
Windows 7 32-bit – 2 GB RAM (min), 3 GB (recommended)  
Windows 7 64-bit – 3 GB RAM (min), 4 GB (recommended) |

¹ Client connection options vary by device and operating system. Consult your HealthCast Project Manager to be sure the end point devices you are considering support the desired VDI environment while meeting your workflow requirements. Virtual Machines hosted on VMware or Microsoft 2012 R2 Hyper-V and delivered with XenDesktop.
Virtual XA Server Environment Considerations

If you are interested in using virtual machine (VM) technology with XA Server, you should be aware of the following minimum requirements.

This configuration is an alternative to the XA Server Configuration detailed above and is required in addition to the XA Technical Environment previously described. Hardware that is currently in your environment and fits the requirements specified can be utilized.

XA server running in a VM should have the VM hardware configured with the following minimum values:

Virtual Server Hardware & Software Requirements

<table>
<thead>
<tr>
<th>XA Server</th>
<th>Primary Software Required</th>
<th>Hardware Specifications</th>
<th>Configuration Requirements</th>
</tr>
</thead>
<tbody>
<tr>
<td>First XA Server</td>
<td>VMware ESXi 5.x and 6.x</td>
<td>4 GB RAM Minimum for 32-bit environments should be allocated to the VM.</td>
<td>Recommend SQL be built as an independent SQL cluster and not installed on eXactACCESS servers or leverage an existing SQL cluster if possible. If SQL is installed on the XA servers then the following configuration is recommended:</td>
</tr>
<tr>
<td></td>
<td>Microsoft Hyper-V on Windows 2012 R2 Enterprise or above(^1)</td>
<td>8 GB RAM Minimum for 64-bit environments should be allocated to the VM.</td>
<td>On the 1st XA Server, the SQL Server instance is active and requires a single SQL Server license based on the number of sockets not cores. See Microsoft Licensing for additional details.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>4 processor cores(^2)</td>
<td>Replication for SQL Server</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Follow best practices for Host utilization (60-80%)</td>
<td>Microsoft Network Load Balancing Service (NLBS)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Virtual environment is configured &gt;= Hosts +1 to prevent over utilization in the event of a host failure</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Create virtual guest rules to ensure that eXactACCESS and SQL resources are highly available (e.g. can survive failure of a single host)</td>
<td></td>
</tr>
<tr>
<td>Second XA Server</td>
<td>Same as Above</td>
<td>Same as Above</td>
<td>On the 2nd XA Server, the SQL server instance is only active when the SQL server instance on the 1st XA Server goes down. Because of its inactive state, no SQL Server license is necessary for the 2nd XA server.</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td>Microsoft Network Load Balancing Service (NLBS)</td>
</tr>
</tbody>
</table>

\(^1\) Server guest operating systems hosting XA server supported under Hyper-V are limited to Windows 2008 R2 SP1 Standard or above, and Windows 2012/R2 Standard or above.

\(^2\) Reducing the number of processor cores from 8 on the physical configuration to 4 on the virtual configuration may require increasing the number of servers hosting XA servers from 2 to 4. This may also impact service demands on domain controllers.

Note: The functions performed by eXactACCESS server are memory and CPU intensive, and may cause performance degradation of all environments running on the machine due to high CPU utilization. It is important to allocate appropriate resources to the VM running the eXactACCESS server and to scale the number of servers appropriately so that users are provided with an optimal experience.
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