2013 HARDWARE & OPERATING SYSTEM RECOMMENDATIONS
## SYSTEM RECOMMENDATIONS

### Recommended Configuration for 2-Socket Workstation

Using Intel™ “SandyBridge” Architecture

<table>
<thead>
<tr>
<th>RECOMMENDATION</th>
<th>CMG IS PURCHASING</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Number of Sockets</strong></td>
<td>2 Sockets</td>
</tr>
<tr>
<td><strong>Processor</strong></td>
<td>Dual 8-Core Xeon™ E5-2687W, 3.1 Ghz, 20M, 8.0GT/s, Turbo+ (16 cores* total)</td>
</tr>
<tr>
<td><strong>Memory</strong></td>
<td>32 GB – 256 GB RDIMM Memory, 1600 Mhz</td>
</tr>
<tr>
<td></td>
<td>All four memory channels populated for maximum memory performance</td>
</tr>
<tr>
<td><strong>Graphics Card</strong></td>
<td>2.5 GB NVIDIA™ Quadro 5000 – 6.0GB NVIDIA Quadro 6000</td>
</tr>
<tr>
<td><strong>Disk Drive</strong></td>
<td>256 SSD drive or 250 GB SATA drive for OS (C:), 500 GB – 1 TB SATA drive for Data (D:)</td>
</tr>
<tr>
<td><strong>CD-ROM</strong></td>
<td>8x DVD+/- RW</td>
</tr>
<tr>
<td><strong>Operating System</strong></td>
<td>Windows 7 Professional (64-bit implied, supports up to 192GB) or Server 2008 R2 Standard or Server 2008 R2 Enterprise Depending upon amount of memory (Std. supports up to 32GB, Ent. Supports up to 2 TB)</td>
</tr>
</tbody>
</table>

*May require Parallel tokens from CMG to use all the cores in the system.*
## Recommended Configuration for 2-Socket Server

**Using Intel™ “SandyBridge” Architecture**

<table>
<thead>
<tr>
<th>Number of Sockets</th>
<th>RECOMMENDATION</th>
<th>CMG IS PURCHASING</th>
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<tbody>
<tr>
<td>2 Sockets</td>
<td>Dual 8-Core Xeon E5-2680, 20M Cache, 2.70 GHz, 8.00 GT/s, Turbo+ or Dual 8-Core Xeon E5-2690, 20M Cache, 2.90 GHz, 8.00 GT/s, Turbo+, if available (16 cores* total)</td>
<td>2 Sockets: servers for SaaS, CMG datacenter and compute clusters</td>
</tr>
</tbody>
</table>

### Processor
- Highest frequency, 8-cores per;
- There is a 6-core, higher frequency model but CMG does not recommend

### Memory
- 32 GB – 256 GB RDIMM Memory, 1600 Mhz
- All four memory channels populated for maximum memory performance
- 64 GB

### Graphics Card
- Not Applicable (Servers not to be used for Visualization)
- Most Servers have built in Video Card on Motherboard and are not configurable

### Disk Drive
- (discuss with vendor regarding speed and capacity)

### CD-ROM
- Optional

### Operating System
- Windows Server 2008 R2 Standard or Server 2008 R2 Enterprise depending upon amount of Memory (Std. supports up to 32GB, Ent. supports up to 2 TB)
- Red Hat Enterprise Linux 6.2 (64-bit)
- Windows Server 2008 R2 Std Red Hat Enterprise Linux 6.2 (64-bit)

*May require Parallel tokens from CMG to use all the cores in the system.
**Recommended Configuration for 4-Socket Server**

Using Intel™ “SandyBridge” Architecture

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<tr>
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<th>CMG IS PURCHASING</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Number of Sockets</strong></td>
<td>4 Sockets</td>
</tr>
<tr>
<td><strong>Processor</strong></td>
<td>4x 8-core E5-4650, 2.70 GHz, 20M Cache, 8.0GT/s QPI Turbo (32 cores* total)</td>
</tr>
<tr>
<td><strong>Memory</strong></td>
<td>128 GB – 512 GB RDIMM Memory, 1600 Mhz - All Four memory channels populated for maximum memory performance</td>
</tr>
<tr>
<td><strong>Graphics Card</strong></td>
<td>Not Applicable (Servers not to be used for Visualization) Most Servers have built in Video Card on Motherboard and are not configurable</td>
</tr>
<tr>
<td><strong>Disk Drive</strong></td>
<td>(discuss with vendor regarding speed and capacity)</td>
</tr>
<tr>
<td><strong>CD-ROM</strong></td>
<td>Optional</td>
</tr>
</tbody>
</table>

*May require Parallel tokens from CMG to use all the cores in the system.*
MODEL CENTRIC RECOMMENDATIONS

Minimum Hardware or Laptop

Small/Medium Black Oil less than 250,000 blocks and/or WinProp™
Intel Xeon- or equivalent AMD™-based PC, 4 GB RAM, Windows XP, Windows Vista™ Business or Windows 7™ 64-bit versions, OpenGL™-capable video card.

Recommended Hardware

- See previous section for the recommended configuration for a 2-socket workstation

Recommended Hardware for Simulation of Large Models

(a) Medium Large: Up to 2,000,000 blocks (IMEX™), 1,000,000 blocks (GEM™), and 500,000 blocks (STARS™)
   - 2 quad-core Intel Xeon 5520 or better with Windows XP x64, Windows 7 x64, or Red Hat Linux 5 update 5 x86_64
   - 12 GB RAM or more
(b) Large: 2,000,000 to 5,000,000 blocks (IMEX), 1,000,000 to 2,500,000 blocks (GEM), and 500,000 to 1,000,000 blocks (STARS)
   - 2 eight-core Intel Xeon E5-2680 or better with Windows XP x64, Windows 7 x64, or Red Hat Linux 6 update 2 for x86_64
   - 8 or 16-core IBM™ Power6™/Power7™-based servers running AIX™ 5.3 or Red Hat Enterprise 5 update 5 for 2013 General Release. CMG plans to switch to AIX 6.1 and Red Hat Enterprise 6 update 2 during the 2013 Updates and by the 2014 General Release.
   - 24 GB RAM or more
(c) Very Large: More than 5,000,000 blocks (IMEX), 2,500,000 blocks (GEM), and 1,000,000 blocks (STARS)
   - 4 8-core Intel Xeon E5-4650’s or better with Windows 2008 HPC if 128 GB of RAM or less, Windows 2008 R2 if 256 GB of RAM or more, or Windows 2012, or Red Hat Linux 6 update 2 for x86_64
   - 32-core or more IBM Power6/Power7 based servers running AIX 5.3 or Red Hat Enterprise 5 update 5 for POWER for 2013 General Release. CMG plans to switch to AIX 6.1 and Red Hat Enterprise 6 update 2 during the 2013 Updates and by the 2014 General Release.
   - 64 GB RAM or more

Recommended Hardware for Visualization of Large Models (Windows XP x64 or Windows 7 x64)

(a) Medium Large: Up to 2,000,000 blocks
   - OpenGL video card such as NVIDIA Quadro FX 1800 or Quadro 2000
   - 12 GB RAM or more
(b) Large: 2,000,000 to 8,000,000 blocks
   - OpenGL video card such as NVIDIA Quadro FX 4800 or Quadro 4000 or Quadro 5000 for up to 10,000,000 blocks
   - 16 GB RAM or more
(c) **Very Large:** More than 8,000,000 blocks
   - OpenGL video card such as NVIDIA Quadro FX 5800 or Quadro FX 6000
   - 24 GB RAM or more

**NOTE:** The RAM and core requirements outlined in this document are approximate, since they are heavily dependent on the properties of the dataset being used:

- Number of components
- Percentage of fully implicit cells
- Whether dual porosity or dual permeability options are used and if so, which ones
- Percentage of grid blocks that are active
- Grid aspect ratio.

**Technical Assistance**

If you require technical assistance, or have specific questions about these hardware and operating system recommendations which are not discussed here, please contact CMG at:

Email: support@cmgl.ca
Phone: +1.403.531.1300