INFORMATION ON SUPPORTED OPERATING SYSTEMS AND HARDWARE REQUIREMENTS
FOR IPM, MOVE, AND DOF PRODUCT SUITES

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Question:

**WHAT OPERATING SYSTEMS AND HARDWARE ARE IPM, MOVE, AND DOF SUITE APPLICATIONS SUPPORTED ON?**

Answer:

Below are the supported operating systems and minimum hardware specifications for the IPM, MOVE, and DOF Suite applications.

If a particular operating system is not supported, it does not necessarily mean that it does not work on that operating system. It may only be that testing has not been completed.

**IPM SUITE**

**Platform Support and Hardware Requirements**

**IPM Version 12.0** is supported on the following operating systems:-

- Windows 7 - SP1 or higher (32 & 64 bit)
- Windows 10 (64 bit)
- Windows Server 2012 R2 (64 bit)
- Windows Server 2016 (64 bit)

If you are using the HARDLOCK network licensing system to run IPM Version 12.0 you must be using HARDLOCK V11.0 or a later version.

**IPM** Version 12.0 has a 32 bit and 64 bit product version. The 32 bit version can run under all supported Windows 64 bit operating systems as 32 bit applications. The 64 bit version will only run on 64 bit operating systems. The 64 bit version is only available on X64 processor types as this is by far the most common type currently in use.

The 32 bit and 64 bit versions are separate products and are purchased and licensed separately.

**IPM** Version 12.0 can run on Windows Server operating systems only when the server is using the Network Licence Manager (HARDLOCK) for licensing. A standalone bitlock cannot be used for server operating systems.

In order to use Python scripts within IPM applications, the following environment must be installed on the computer; Anaconda 2019.03 (Python 3.7.3) with the same bit-ness as the IPM software.
**IPM HARDWARE REQUIREMENTS**

**IPM Version 12.0**

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Processor</td>
<td>2.4 Ghz Quad Core i5 (or higher)</td>
</tr>
<tr>
<td>Total Physical Memory</td>
<td>4 GB (use 64Bit OS and IPM 64bit for large models that require more than 4GB)</td>
</tr>
<tr>
<td>Local Disks</td>
<td>10 GB full IPM suite</td>
</tr>
<tr>
<td>Monitor Resolution</td>
<td>SVGA (1280 x 1024)</td>
</tr>
</tbody>
</table>

If a standalone bitlock is to be used then one USB port is required for the bitlock.
**MOVE SUITE**

**Platform Support and Hardware Requirements**

**MOVE Version 2019** is supported on the following operating systems:-
- Windows 7 - SP1 or higher (64 bit), Windows 8.1 (64 bit)
- Windows 10 (64 bit)
- Windows Server 2012 R2 (64 bit)
- Windows Server 2016 (64 bit)

**MOVE** Version 2019 is a 64 bit product version only. The 64 bit version will only run on 64 bit operating systems. The 64 bit version is only available on x64 processor types as this is by far the most common type currently in use. **MOVE** will NOT run on 32-bit operating systems.

If you are using the **HARDLOCK** network licensing system to run **MOVE** Version 2019 you must be using **HARDLOCK** V11.0 or a later version.

**MOVE** Version 2019 can run on Windows Server operating systems only when the server is using the Network Licence Manager (**HARDLOCK**) for licensing. A standalone bitlock cannot be used for server operating systems.

**MOVE Hardware Requirements**

**MOVE Version 2019.1**

- **Processor**: 2.4 Ghz Quad Core i5 (minimum)
  Recommend dual or 8C/12C/24C processors
- **Total Physical Memory**: 8 GB (minimum)
  Recommend 16-128GB for very large models that utilize 3D seismic or DEMs with overlays
- **Local Disks**: 5 GB for full **MOVE** suite
  Recommend SSD or fast SAS for seismic
- **Graphics Card**: Discrete graphics card (4GB RAM minimum)
  Must support OpenGL, Pixel Shader 2 or later
  Recommend NVIDIA Quadro with 8-24 GB to utilize 3D seismic or DEMs with overlays
- **Monitor Resolution**: Minimum FHD (1920 x 1080)
  Recommend two 4K/QHD/UHD monitors
HARDLOCK – NETWORK LICENCE MANAGER

HARDLOCK Version 11.0 (latest Version) is supported on the following operating systems:

- Windows 7 - SP1 or higher (32 & 64 bit)
- Windows 10 (64 bit)
- Windows 2012 Server R2 (64 bit)
- Windows 2016 Server (64 bit)

The HARDLOCK is only available as a 32 bit version. It is supported on 32 bit and 64 bit operating systems as described above. The 32 bit version of the HARDLOCK is able to distribute licences to 32 and 64 bit versions of the client programs (i.e. IPM/IFM/IVM) assuming such licences have been purchased.

Hardware Requirements

HARDLOCK Version 11.0

- Processor: 1 Ghz
- Total Physical Memory: 1 GB
- Local Disks: 2 GB
- Monitor Resolution: SVGA (800 x 600)

A USB port is required for the HARDLOCK bitlock.
**DOF SUITE**

**IFM Version 6.0**

IFM Version 6.0 client software is supported on the following operating systems:
- Windows 7 - SP1 or higher (64 bit)
- Windows 10 (64 bit)
- Windows Server 2012 R2 (64 bit)
- Windows Server 2016 (64 bit)

If you are using the HARDLOCK network licensing system to run IFM Version 6.0 you must be using HARDLOCK V11.0 or a later version.

IFM Version 6.0 has a 64 bit product version.

IFM Version 6.0 can run on Windows Server operating systems only when the server is using the Network Licence Manager (HARDLOCK) for licensing. A standalone bitlock cannot be used for server operating systems.

In order to use Python scripts within IFM applications, the following environment must be installed on the computer; Anaconda 2019.03 (Python 3.7.3) with the same bit-ness as the IFM software.

**IFM Hardware Requirements**

**IFM Database Server**

- Processor: 2.4 Ghz Quad Core i7 (or higher)
- Total Physical Memory: 64 GB
- Local Disks (space available for database files): 1000 GB
- Operating System: MS Windows Server 2016 (64 bit)
- Database Platform: Microsoft SQL Server 2016 SP1 (64 bit)
  Or Microsoft SQL Server 2017 (64 bit)

**IFM Data Server**

- Processor: 2.4 Ghz Quad Core i7 (or higher)
- Total Physical Memory: 64 GB
- Local Disks: 100 GB
- Operating System: MS Windows Server 2016 (64 bit)
**IFM RTC Server (Automated Jobs Server)**

<table>
<thead>
<tr>
<th>Processor</th>
<th>2.4 Ghz Quad Core i7 (or higher)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Physical Memory</td>
<td>64 GB (see note below)</td>
</tr>
<tr>
<td>Local Disks</td>
<td>300 GB (see note below)</td>
</tr>
<tr>
<td>Operating System</td>
<td>MS Windows Server 2016 (64 bit)</td>
</tr>
</tbody>
</table>

**IFM Cluster Machine Server (Automated Jobs Server)**

<table>
<thead>
<tr>
<th>Processor</th>
<th>2.4 Ghz Quad Core i7 (or higher)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Physical Memory</td>
<td>64 GB (see note below)</td>
</tr>
<tr>
<td>Local Disks</td>
<td>300 GB (see note below)</td>
</tr>
<tr>
<td>Operating System</td>
<td>MS Windows Server 2016 (64 bit)</td>
</tr>
</tbody>
</table>

**IFM Client**

<table>
<thead>
<tr>
<th>Processor</th>
<th>2.4 Ghz Quad Core i5 (or higher)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Physical Memory</td>
<td>16 GB</td>
</tr>
<tr>
<td>Local Disks</td>
<td>120 GB</td>
</tr>
<tr>
<td>Operating System</td>
<td>MS Windows 7 (64 bit)</td>
</tr>
<tr>
<td></td>
<td>MS Windows 10 (64 bit)</td>
</tr>
<tr>
<td></td>
<td>MS Windows Server 2016 (64 bit)</td>
</tr>
</tbody>
</table>

**Notes**

- **IFM** 64-bit works only with the **IPM** 64-bit version and the **IVM** 64-bit version.
- Database Server: The use of dedicated database server running a single database instance is strongly recommended as well as hosting the database server on a physical machine.
- Database Server: The use of dedicated disks for database data, log and backup file is strongly recommended to provide isolation and performance.
- Database Server: The use of flash based storage devices is recommended.
- The use of high end specified PCs for the RTC Server (Automated Jobs server) is recommended if multiple (and/or large) fields have to be served.
- The RAM and Hard Disk requirements for both the RTC Server and Cluster Machines are dependent on the field size (please to the **DOF Pre-requisites document for sizing information**).
IVM Version 9.0

IVM Version 9.0 is supported on the following operating systems:

- Windows 7 - SP1 or higher (64 bit)
- Windows 10 (64 bit)
- Windows Server 2012 R2 (64 bit)
- Windows Server 2016 (64 bit)

IVM Version 9.0 has a 64 bit product version.

IVM Version 9.0 can run on Windows Server operating systems only when the server is using the Network Licence Manager (HARDLOCK).

In order to use Python scripts within IFM applications, the following environment must be installed on the computer; Anaconda 2019.03 (Python 3.7.3) with the same bit-ness as the IFM software.

IVM Hardware Requirements

IVM Database Server

Processor: 2.4 Ghz Quad Core i7 (or higher)
Total Physical Memory: 64 GB
Local Disks (space available for database files): 1000 GB
Operating System: MS Windows Server 2016 (64 bit)
Database Platform: Microsoft SQL Server 2016 SP1 (64 bit) or Microsoft SQL Server 2017 (64 bit)

IVM Server

Processor: 2.4 Ghz Quad Core i7 (or higher)
Total Physical Memory: 64 GB
Local Disks (space available for application files): 300 GB
Operating System: MS Windows Server 2016 (64 bit)
IVM Client

- Processor: 2.4 Ghz Quad Core i5 (or higher)
- Total Physical Memory: 16 GB
- Local Disks: 120 GB
- Operating System: MS Windows 7 – SP1 or higher (64-bit)
  MS Windows 10 (64-bit)
  MS Windows Server 2016 (64 bit)

Notes

- IVM 64-bit works only with the IPM 64-bit version and the IFM 64-bit version
- The use of dedicated database server running a single database instance is strongly recommended as well as hosting the database server on a physical machine.
- The use of dedicated data disk for database files is recommended to provide isolation and protection upon a failure in a single area.
- The use of flash based storage devices is recommended.
INFORMATION ON IPM AND DOF SOFTWARE ARCHITECTURE

For the Petex Digital Oil Field (DOF), the client can purchase only the 64-bit version of IPM v.12.0, IFM v.6.0 and IVM v.9.0.

For IPM which is not part of the Petex Digital Oil Field (DOF), IPM has 32 and 64 bit products versions which the client can choose to license, and which have separate licences.

SHOULD A CLIENT PURCHASE OR UPGRADE TO 64 BIT APPLICATIONS?

All DOF must use 64-bit software for both DOF and IPM

For IPM which is not part of the Petex DOF, this is a technical decision which has to be addressed on the user needs and the type of work and models they are running. Petex can give some guidance, however the benefits do need to assessed by the users directly.

In an IPM only environment:

Where a client model needs to use large amount of memory and/or processors then using the Windows Operating System 64 bit and Petex software 64 bit is advised.

Points to consider are:

- **REVEAL**: Petex advises clients to purchase 64 bit. If running a reservoir simulation model with more than 350,000 active grid blocks and the user wishes to bring this model into REVEAL they will require the 64 bit application.

- **RESOLVE**: All models where a large number of scenarios will require the 64 Bit application. As a rule of thumb:
  - if: $T (Nv \times S \times Nc) > 10^5$ then the users will need RESOLVE 64 bit
  - where $T =$ Forecast timesteps; $Nv =$ number of variables to be reported; $S =$ number of scenarios; $Nc =$ number of internal RESOLVE connections (links).

- **GAP**: The size and number of wells and lift curves is the key consideration in requiring the 64-bit version due to all the additional developments that have been added to GAP for flow assurance analysis and reporting, etc. The following points can be used to understand when 64 Bit version is required:
  - Where lift curves use 4 to 5 variables and over 30 wells (e.g. ESP and/or Gas Lift with Associated Gas Lift Injection System).
  - Large Shale Oil & Gas models.
  - When PROSPER 64 bit is required (see below) then GAP 64 bit should also be used.
  - **GAP Transient**: It is a requirement to have GAP 64 bit in order to use the GAP Transient module. GAP Transient is a separately licenced add-on to GAP 64 bit.

- **PROSPER**: If you wish to use large numbers of sensitivity values in PROSPER (i.e. more than 32,000 combinations) PROSPER 64 bit will be required.

- Other considerations:
PC and Server type and hardware specification
- Windows Operating System being supported on the user PC or Server

**BENEFITS OF 64 BIT APPLICATIONS:**
- A Windows 64 bit operating system can run both 32 bit or 64 bit applications.
- A single 32 bit application can use up to a maximum of 2 GBytes of RAM memory.
- A single 64 bit application can use up to a maximum of 8 TBytes of RAM memory.
- Windows 7 64 bit manages the use of the computer processors and memory more efficiently

**LICENSING**
For IPM which is not part of the Petex DOF, the IPM 32 bit software licence will only allow the 32 bit applications to be used, even when the Windows operating system is 64 bit.

Clients with 64 Bit IPM licences will be able to use the 64 bit or 32 bit IPM Suite software. The number of concurrent licences is limited by the number of 64 bit licences under the agreement.

**CONVERSION FROM 32 BIT TO 64 BIT**
There is an economical conversion from existing IPM, IFM and IVM clients with the 32 bit products that wish to convert their licences to 64 Bit products. Please contact Petex for a quotation.

**PURCHASING NEW OR ADDITIONAL LICENCES**
Clients can purchase new licences or additional licences.

For IPM which is not part of the Petex DOF, there is the option to purchase 32 bit or 64 bit products. For IPM, IFM and IVM which forms the Petex DOF, 64 bit products must be purchased. The price list of the 32 bit and 64 bit is the standard Petex volume structure meaning that the unit price of each additional licence added to the same agreement for a product is on a descending unit price scale.