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

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Question:

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

Answer:

Below are the supported operating systems and minimum hardware specifications for the **IPM** 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 (INCLUDING MOVE)

Platform Support and Hardware Requirements

IPM Version 12.5 is supported on the following 64-bit operating systems:-

- Windows 10
- Windows Server 2012 R2
- Windows Server 2016
- Windows Server 2019

If you are using the **HARDLOCK** network licensing system to run **IPM** Version 12.5 you must be using **HARDLOCK** 11.5 or a later version.

IPM Version 12.5 has a 32-bit and 64-bit product version. The 32-bit version can run under all supported Windows 64-bit operating systems as a 32-bit application. The 64-bit version is only available on x64 processor types as this is by far the most common type currently in use.

MOVE is a 64-bit product only.

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

IPM Version 12.5 can run on Windows Server operating systems only when the server is using the Network License 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 (**as a minimum**) on the appropriate computers; Anaconda 2019.03 (Python 3.7.3) with the same bit-ness as the IPM software. **Python 3.8 is also supported.**



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IPM HARDWARE REQUIREMENTS

IPM Version 12.5 - General

Processor	2.4 Ghz Quad Core i5 (or higher)
Total Physical Memory	4 GB (use 64-bit OS and IPM 64-bit for large models that require more than 4 GB)
Local Disks	10 GB full IPM suite
Monitor Resolution	SVGA (1280 x 1024)

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

IPM Version 12.5 – Additional MOVE requirements

Total Physical Memory	16 GB (or higher)
Graphics Card (GPU) Memory	4 GB (or higher) discrete GPU / graphics card Must support OpenGL 2.1, Pixel Shader 2.0
Monitor Resolution	FHD (1920 x 1080) Recommend two 4K/QHD/UHD monitors

MOVE Performance Notes:

- We would recommend **32-128 GB** of Total Physical Memory, and **6-32 GB** GPU Memory for models that utilise larger 2D seismic, 3D seismic cubes, DEMs, LiDAR data, or high resolution image overlays.
- MOVE will work with an on-board integrated graphics (GPU), however this is not supported.
- The graphics card software driver should be fully up to date.

Example GPU hardware:

Ideal workstation	NVIDIA Quadro with 8-48 GB RAM e.g. Quadro , RTX 4000/5000/6000/8000, P5000, P6000, GP100, GV100
Ideal notebook	NVIDIA Quadro with 6-26 GB RAM e.g. Quadro RTX 3000/4000/5000/6000, P3200, P4200, P5200
Ideal notebook	NVIDIA GeForce with 6-8 GB RAM e.g. GeForce RTX 2060/2070/2070S/2080/2080S
Adequate workstation	NVIDIA Quadro with 4-8 GB RAM e.g. Quadro P1000, P2200, P4000
Adequate notebook	NVIDIA Quadro with 4-6 GB RAM e.g. Quadro T1000, T2000, P1000, P2000
Adequate notebook	NVIDIA GeForce with 4-6 GB RAM e.g. GeForce GTX 1650, 1650 Ti, 1660 Ti



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HARDLOCK – NETWORK LICENCE MANAGER

HARDLOCK Version 11.5 (latest Version) is supported on the following 64-bit operating systems:-

- Windows 10
- Windows Server 2012 R2
- Windows Server 2016
- Windows Server 2019

The **HARDLOCK** is only available as 32-bit software, although it is supported on the 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/MOVE**) assuming such licences have been purchased.

Hardware Requirements

HARDLOCK Version 11.5

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.



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DOF SUITE

IFM Version 6.5

IFM Version 6.5 client software is supported on the following 64-bit operating systems:-

- Windows 10
- Windows Server 2012 R2
- Windows Server 2016
- Windows Server 2019

If you are using the **HARDLOCK** network licensing system to run **IFM** Version 6.5 you must be using **HARDLOCK** V11.5 or a later version.

IFM Version 6.5 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 (**as a minimum**) on the appropriate computers; Anaconda 2019.03 (Python 3.7.3) with the same bit-ness as the IFM software. **Python 3.8 is also supported.**

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) Or MS Windows Server 2019 (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	200 GB



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Operating System

MS Windows Server 2016 (64-bit)
Or MS Windows Server 2019 (64-bit)



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IFM RTC Server (Automated Jobs Server)

Processor	2.4 Ghz Quad Core i7 (or higher)
Total Physical Memory	64 GB (see note below)
Local Disks	200 GB (see note below)
Operating System	MS Windows Server 2016 (64-bit) Or MS Windows Server 2019 (64-bit)

IFM Cluster Machine Server (Automated Jobs Server)

Processor	2.4 Ghz Quad Core i7 (or higher)
Total Physical Memory	64 GB (see note below)
Local Disks	200 GB (see note below)
Operating System	MS Windows Server 2016 (64-bit) Or MS Windows Server 2019 (64-bit)

IFM Client

Processor	2.4 Ghz Quad Core i5 (or higher)
Total Physical Memory	16 GB
Local Disks	120 GB
Operating System	MS Windows 10 (64-bit) Or MS Windows Server 2012 R2 (64-bit) Or MS Windows Server 2016 (64-bit) Or MS Windows Server 2019 (64-bit)

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 servers 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 refer to the **DOF** Pre-requisites document for sizing information).
- Additional Information is provided in the **DOF** Pre-requisites document



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IVM Version 9.5

IVM Version 9.5 is supported on the following 64-bit operating systems:

- Windows 10
- Windows Server 2012 R2
- Windows Server 2016
- Windows Server 2019

IVM Version 9.5 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 IVM applications, the following environment must be installed (as a **minimum**) on the appropriate computers; Anaconda 2019.03 (Python 3.7.3) with the same bit-ness as the IVM software. **Python 3.8 is also supported.**

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) Or MS Windows Server 2019 (64-bit)
Database Platform	Microsoft SQL Server 2016 SP1 (64-bit) Or Microsoft SQL Server 2017 (64-bit)

IVM Data Manager Server

Processor	2.4 Ghz Quad Core i7 (or higher)
Total Physical Memory	64 GB
Local Disks (space available for application files)	200 GB
Operating System	MS Windows Server 2016 (64-bit) Or MS Windows Server 2019 (64-bit)



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IVM Client

Processor	2.4 Ghz Quad Core i5 (or higher)
Total Physical Memory	16 GB
Local Disks	120 GB
Operating System	MS Windows 10 (64-bit) MS Windows Server 2012 R2 (64-bit) MS Windows Server 2016 (64-bit) MS Windows Server 2019 (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.
- Additional Information is provided in the **DOF** Pre-requisites document



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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.12.5, **IFM** v.6.5 and **IVM** v.9.5.

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 be assessed by the users directly.

In an IPM only environment:

Where a client model needs to use a 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: $T (N_v * S * N_c) > 10^5$ then the users will need **RESOLVE** 64-bit
 - where T = Forecast timesteps; N_v = number of variables to be reported; S – number of scenarios; N_c = 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 licensed 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:



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- 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.