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ThinkSystem 4X67A86130 Intel Flex 140 12GB Gen4 Passive GPU User Guide

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Product Guide

The Think System Intel Flex 140 12GB Gen4 Passive GPU is a general-purpose GPU optimized for media stream density and quality. It is designed for data center and edge applications, with high levels of reliability, availability, and scalability. The GPU is suitable for media processing and delivery, Windows and Android cloud gaming, virtualized desktop infrastructure (VDI), and AI visual inference applications.
The Intel Data Center GPU Flex 140 suitable for workloads that involve lighter AI models, such as simple object detection. Due to the higher number of video engines, the Flex Series 140 GPU can support a high number of streams.

Figure 1. Think System Intel Flex 140 12GB Gen4 Passive GPU

Did you know?
The Intel Flex Series GPUs support an open, flexible, standards-based software stack together with one API so developers can build high-performance, cross-architecture applications and solutions. This helps organizations reduce the complexity, cost, and time requirements to bring new solutions to market, enabling engineers and programmers to innovate instead of maintaining code.

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Think System Intel Flex 140 12GB Gen4 Passive GPU

Part number information

The following table shows the ordering information for the Flex 140 GPU.
Table 1. Ordering information

Part number	Feature code	Description
4X67A86130	BU00	Think System Intel Flex 140 12GB Gen4 Passive GPU

The option part number includes the following:

- One Flex 140 GPU
- Low profile (2U) and full-height (3U) adapter brackets
- Documentation

Features

Intel Data Center GPU Flex Series is a flexible, robust, and the industry's most open GPU solution for the intelligent visual cloud. The GPUs support a diverse range of workloads in the industry starting with media streaming and cloud gaming, followed by support for AI visual inference and virtual desktop Infrastructure workloads. It supports an open, standards-based software stack optimized for density and quality with critical server capabilities for high reliability, availability, and scalability. This helps reduce the need for data centers to use disparate solutions and manage heterogenous or proprietary environments.

The Think System Intel Flex 140 12GB Gen4 Passive GPU offers the following features:

- **Open Architecture**

  The Intel Flex Series GPU supports an open, flexible, standards-based software stack together with one API so developers can build high-performance, cross-architecture applications and solutions. This helps organizations reduce the complexity, cost, and time requirements to bring new solutions to market, enabling engineers and programmers to innovate instead of maintaining code.

- **Built-In AV1 Encode**

  Services built on the royalty-free open-source AV1 codec mean lowering operational expenses while providing higher video quality. Advanced video coding (AVC), High Efficiency Video Coding (HEVC), and VP9 support also comes standard with the Intel Data Center GPU.

- **No Licensing Fees**

  Intel provides free virtual GPU software license to customers for lowering their total cost of ownership in VDI deployments. Furthermore, this can act as a catalyst to accelerate the GPU adoption rate in VDI deployments where graphics & encode accelerations are desired/preferred but can often be cost prohibitive.

- **Flexible v GPU Management**

  The Intel Data Center GPU Flex Series supports multiple v GPU configuration & scheduling options for VDI solutions to meet different customer workload and QoS requirements—such as Linux KVM open-source virtualization technology and VMware ESXi. It also supports both VMware Horizon and Citrix DaaS† on top. The Flex Series accelerators have strong ecosystem support. The top two industry leading desktop & application virtualization solutions, VMware Horizon and Citrix Daas, will be supported.

- **Flexible Performance**

  The Flex 140 accelerator has two GPUs on a single card, supporting heterogeneous v GPU profiles. Having fewer virtual machines per GPU contributes to more predictable quality of service, shorter GPU scheduling queues, and strong performance isolation across machines. Smaller physical cards and fewer virtual machines means you can cover a variety of user needs more economically.

- **High Density Virtual Desktop**

  The Intel Data Center GPU Flex 140 is ideal for VDI deployments targeting knowledge workers persona – office productivity, video, and browser workloads whose graphics and compute performance requirements are low.

Technical specifications

The following table lists the specifications of the Flex 140 GPU.

Table 2. Specifications

Feature	Flex 140
GPU Architecture	Xe HPG
GPUs per card	2
Execution units	256 (128 per GPU)
Intel Xe Cores	16 cores (8 per GPU)
Media Engine	4 (2 per GPU)
Ray Tracing	16 RT units
FP32 peak performance	8 TFLOPS
FP16 peak performance	52 TFLOPS
INT8 peak performance	105 TOPS
INT4 peak performance	210 TOPS
GPU Memory	12 GB ECC GDDR6 (6 GB per GPU)
Memory Bandwidth	336 GB/s (168 GB/s per GPU)
Virtualization (SR-IOV)	62 Virtual Functions (VFs)
System Interface	PCIe Gen 4, x8 lanes (x16 mechanical)
Form Factor	PCIe low profile, single width
Max Power Consumption	75 W
Thermal Solution	Passive
Encoding and decoding	- H.264 Hardware Encode/Decode - H.265 (HEVC) Hardware Encode/Decode - AV1 Encode/Decode - VP9 Bitstream & Decoding

Server support

The following tables list the Think System servers that are compatible.

Table 3. Server support (Part 1 of 4)

Part Number	Description	Edge					1S V3		AMD V3					Intel V3						Multi Node	
		SE350 (7Z46/7D1X)	SE350 V2 (7DA9)	SE360 V2 (7DAM)	SE450 (7D8T)	SE455 V3 (7DBY)	ST250 V3 (7DCF/7DCE)	SR250 V3 (7DCM/7DCL)	SR635 V3 (7D9H/7D9G)	SR655 V3 (7D9F/7D9E)	SR645 V3 (7D9D/7D9C)	SR665 V3 (7D9B/7D9A)	SR675 V3 (7D9Q/7D9R)	ST650 V3 (7D7B/7D7A)	SR630 V3 (7D72/7D73)	SR650 V3 (7D75/7D76)	SR850 V3 (7D97/7D96)	SR860 V3 (7D94/7D93)	SR950 V3 (7DC5/7DC4)	SD530 V3 (7DDA/7DDD3)	SD550 V3 (7DD9/7DD2)
4X67A86130	Think System Intel Flex 140 12GB Gen4 Passive GPU	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	1	2

Table 4. Server support (Part 2 of 4)

Part Number	Description	Super Computing					1S Intel V2			2S Intel V2				AMD V1				
		SD665 V3 (7D9P)	SD665-N V3 (7DAZ)	SD650 V3 (7D7M)	SD650-I V3 (7D7L)	SD650-N V3 (7D7N)	ST50 V2 (7D8K / 7D8J)	ST250 V2 (7D8G / 7D8F)	SR250 V2 (7D7R / 7D7Q)	ST650 V2 (7Z75 / 7Z74)	SR630 V2 (7Z70 / 7Z71)	SR650 V2 (7Z72 / 7Z73)	SR670 V2 (7Z22 / 7Z23)	SR635 (7Y98 / 7Y99)	SR655 (7Y00 / 7Z01)	SR655 Client OS	SR645 (7D2Y / 7D2X)	SR665 (7D2W / 7D2V)
4X67A86130	ThinkSystem Intel Flex 140 12GB Gen4 Passive GPU	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N

Table 5. Server support (Part 3 of 4)

Part Number	Description	Dense V2				4S V2		8S	4S V1				1S Intel V1			
		SD630 V2 (7D1K)	SD650 V2 (7D1M)	SD650-N V2 (7D1N)	SN550 V2 (7Z69)	SR850 V2 (7D31 / 7D32)	SR860 V2 (7Z59 / 7Z60)	SR950 (7X11 / 7X12)	SR850 (7X18 / 7X19)	SR850P (7D2F / 2D2G)	SR860 (7X69 / 7X70)	ST50 (7Y48 / 7Y50)	ST250 (7Y45 / 7Y46)	R150 (7Y54)	SR250 (7Y52 / 7Y51)
4X67A86130	ThinkSystem Intel Flex 140 12GB Gen4 Passive GPU	N	N	N	N	N	N	N	N	N	N	N	N	N	N

Table 6. Server support (Part 4 of 4)

Part Number	Description	2S Intel V1								Dense V1			
		ST5550 (7X09 / 7X10)	SR530 (7X07 / 7X08)	SR550 (7X03 / 7X04)	SR570 (7Y02 / 7Y03)	SR590 (7X98 / 7X99)	SR630 (7X01 / 7X02)	SR650 (7X05 / 7X06)	SR670 (7Y36 / 7Y37)	SD530 (7X21)	SD650 (7X58)	SN550 (7X16)	SN850 (7X15)
4X67A86130 0	Think System Intel Flex 140 12GB Gen 4 Passive GPU	N	N	N	N	N	N	N	N	N	N	N	N

Software stack

The Flex Series GPU supports an open, flexible, standards-based software stack with one API cross architecture programming. The stack includes open source components and libraries, tools and frameworks so developers can create high-performance, cross-architecture media applications and solutions to meet a wide range of use cases. This open approach removes the barriers to proprietary models where code portability and the ability to adopt new architectures across multiple vendors is limited.

Intel enables the software ecosystem through industry collaborations, initiatives and standards bodies. It also provides ongoing leadership, investment and technical contributions to the open source community.

The common set of software capabilities integrates into popular middleware and frameworks, and the stack is delivered in validated productized containers or reference stacks. The containers can be orchestrated with Kubernetes on bare metal or in VMs using SR-IOV virtualization with tools to assign and manage workloads. The toolset is designed to speed time-to-market and enable flexible deployment of multiple workloads on the same GPU.

Figure 2. Software Stack for Intel Data Center GPU Flex Series **(source: intel.com)**

Software Stack for Intel® Data Center GPU Flex Series
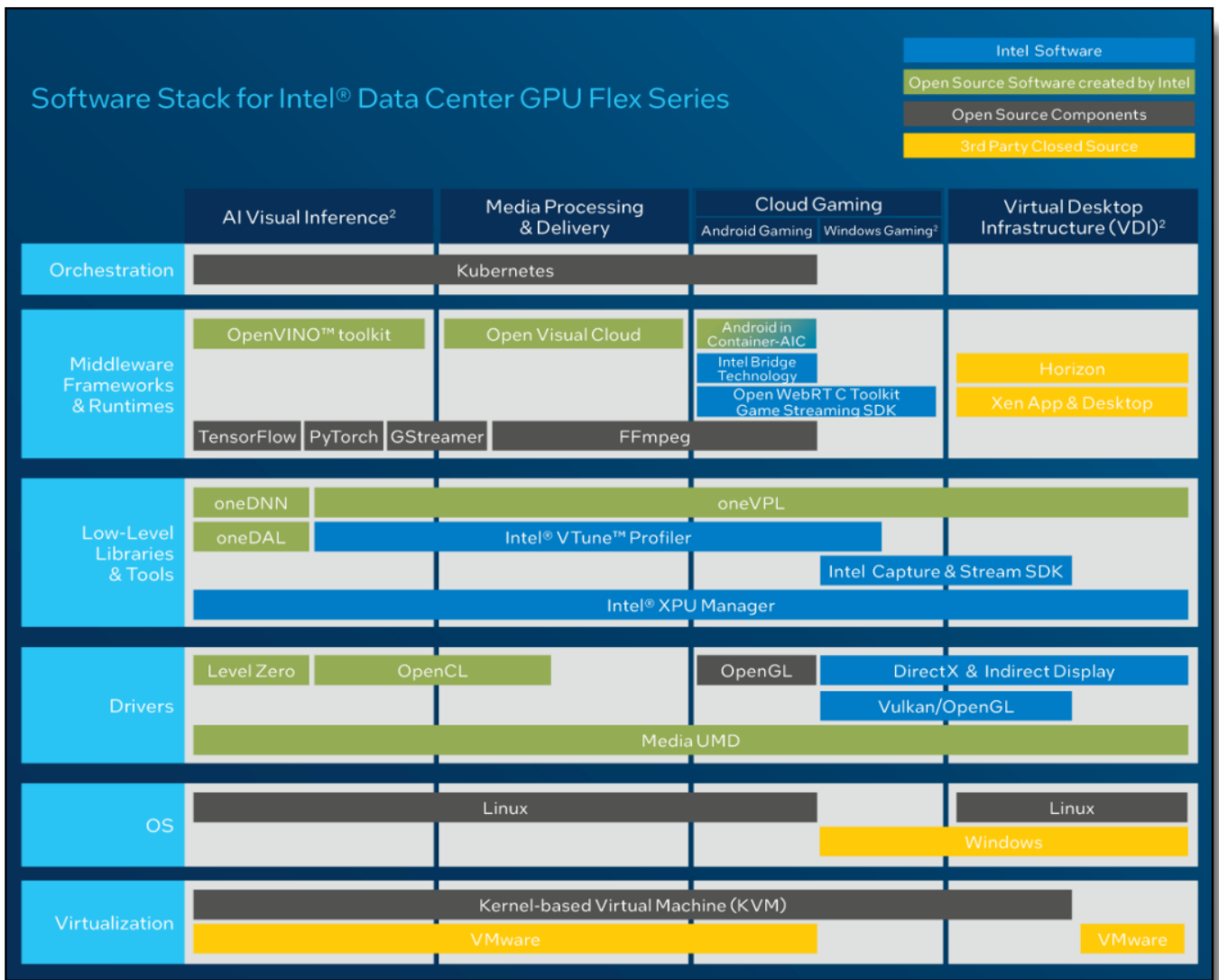
The following components are part of the Intel one API Base Toolkit (individual tools can be downloaded separately):

- one API Deep Neural Network Library (one DNN)
- one API Data Analytics Library (one DAL)
- one API Video Processing Library (one VPL)
- Intel V Tune Profiler

The following Intel-optimized tools are part of the Intel AI Analytics Toolkit:

- Tensor Flow
- Py Torch

For more information about Intel one API, see **https://intel.com/oneapi**

Operating system support

The following table lists the supported operating systems:

Tip: These tables are automatically generated based on data from **Lenovo Server Proven**.
Table 7. Operating system support for Think System Intel Flex 140 12GB Gen4 Passive GPU, 4X67A86130

Operating systems	SD 530 V3	SD 550 V3
Microsoft Windows Server 2022	Y	Y
VMware vSphere Hypervisor (ES Xi) 7.0 U3	Y	Y

Auxiliary power cable

The Flex 140 GPU does not require an auxiliary power cable.

Operating environment

The Flex 140 GPU has the following operating characteristics:

- **Ambient temperature**
  - **Operational:** 0°C to 85°C
  - **Storage:** -40°C to 70°C
- **Relative humidity**:
  - **Operational:** 5 to 85%
  - **Storage:** 5 to 90%

Physical specifications

The Flex 140 GPU has the following physical specifications:

- **Height:** 69 mm (including edge connector)
- **Length:** 168 mm
- **Width:** 19 mm
- **Weight:** 400 g

Warranty

One year limited warranty. When installed in a Lenovo server, the GPU assumes the server's base warranty and any warranty upgrades.

Related publications

For more information, refer to these documents:

- **Think System and Think Agile GPU Summary:**

  https://lenovopress.lenovo.com/lp0768-thinksystem-thinkagile-gpu-summary
- **Server Proven compatibility:**

- **Intel Data Center GPU Flex Series product page:**

  https://www.intel.com/content/www/us/en/products/details/discrete-gpus/data-center-gpu/flexseries.html

- **Intel one API:**

  https://intel.com/oneapi

Related product families

Product families related to this document are the following:

- **GPU adapters**

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References

- **L [ThinkSystem and ThinkAgile GPU Summary > Lenovo Press](#)**
- **L [ThinkSystem Intel Flex 140 12GB Gen4 Passive GPU Product Guide > Lenovo Press](#)**
- **L [GPU adapters > Lenovo Press](#)**
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