

NVIDIA[®] NVS[™]
AUTHORIZED PARTNER

PNY[®]

NVIDA NVS Product Line Presentation

2 | 4 | 8 Display Business Graphics Solutions

NVIDIA NVS

The standard for multi-display business graphics



FINANCIAL INSTITUTIONS

- > Trading Floors
- > Insurance and Banking Centers



DIGITAL SIGNAGE

- > Airport Signage
- > Restaurants and Shopping Malls



PROCESS CONTROL

- > Government Institutions
- > Control and Command Centers



BUSINESS ENVIRONMENTS

- > Call Centers
- > Hospitals

NVIDIA NVS

Market opportunities

Traditional Markets



- Financial centers
- Trading floors
- Call centers
- Corporate desktops

New Growth Markets



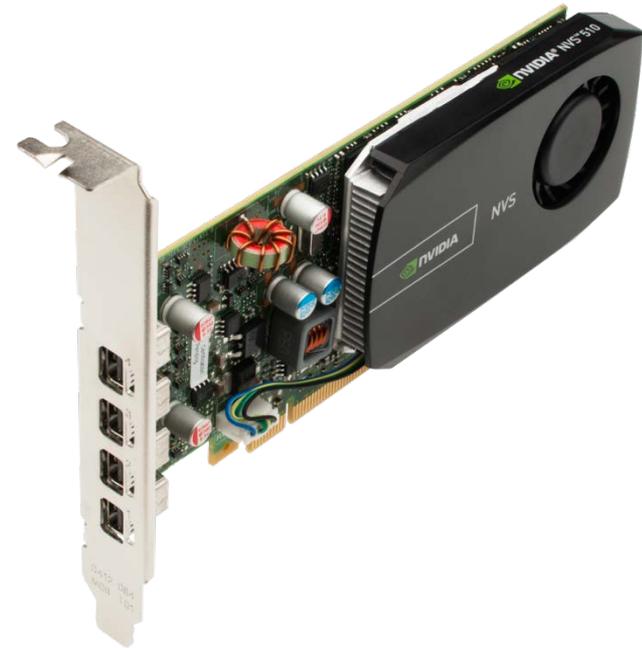
- Digital signage
- Public facilities (airports, hospitals)
- Retail
- Emergency response
- Process control



NVIDIA NVS

Extraordinarily high customer satisfaction and retention

- 9 out of 10 top global financial institutions standardize on NVIDIA NVS
- Defacto graphics solution for multi-display business environments



NVIDIA NVS Features and Benefits

▪	Maximum reliability
▪	Long product lifecycles and a 3 year hardware warranty
▪	Low power consumption and acoustical footprint
▪	Built for multi-display business and enterprise environments
▪	Intuitive NVIDIA NVIEW desktop management utility
▪	NVIDIA Mosaic display management software
▪	Robust IT management tools
▪	Enterprise sales and support



NVIDIA NVS

Why do customers select NVS?

Advanced Display Capability	Reliability				Availability and Serviceability	
	NVS 310 v2	NVS 315	NVS 510	NVS 810	Consumer Graphics	Integrated Graphics
Maximum Number of Displays	2	2	4	8	2 - 4	3
Display Expandability	✓	✓	✓	✓	✓	
Productivity Enhancing Display Management Tools	✓	✓	✓	✓		
Low Power Graphics < 25 W	✓	✓				✓
Technology to Optimize System Uptime	✓	✓	✓	✓		
Enterprise Tools for Remote IT Management	✓	✓	✓	✓		
Serviceability Cost	\$	\$	\$	\$	\$	\$\$\$ ¹

¹Integrated graphics serviceability requires system replacement



NVIDIA NVS Product Line

Enterprise ready business graphics solutions

	NVS 310 v2	NVS 315	NVS 510	NVS 810
				
Frame Buffer	1GB DDR3	1GB DDR3	2GB DDR3	4GB DDR3 (2GB x 2)
CUDA Processor Cores	48	48	192	1024 (512 x 2)
Memory Interface	64-bit	64-bit	128-bit	128-bit (Per GPU)
Bus Interface	PCIe Gen 2.0 x16	PCIe Gen 2.0 x16	PCIe Gen 2.0 x16	PCIe Gen 3.0 x16
Display Connector	2 DP 1.2	DMS-59	4 DP 1.2	8 mDP 1.2
Max Displays Per Board	2	2	4	8
Max DisplayPort Resolution	2560 x 1600	2560 x 1600	3840 x 2160	4096 x 2160
Max DVI Resolution	1920 x 1200	1920 x 1200	1920 x 1200	1920 x 1200
Max Analog Resolution	—	2548 x 1536	—	—
Max Power Consumption	19.5 W	19.5 W	35 W	68 W
Cooling System	Active Fansink	Active Fansink	Active Fansink	Active Fansink

NVIDIA NVS 310 v2

DisplayPort 1.2 and 30-bit color 2 display business graphics

CUDA Cores	48
GPU	GF119-825
GPU Memory	1GB DDR3
Form Factor	Single Slot, 5.70" x 2.713"
PCIe	Gen 2.0 x16
Display Connectors	2x DP 1.2
Max Display Configuration	2x 2560 x 1600 at 60Hz
Max Board Power	19.3 W
DVI-I Single Link or VGA	2 via Adapter
DisplayPort	2 via adapter
NVIEW	Yes
Mosaic	Windows 10, 8.1, 8, 7
Thermal Solution	Active Fansink
MSRP	\$159 DP \$159 DVI
PNY Part Number	VCNVS310DP-PB ¹



¹Shown here, PNY PN VCNVS310DVI-PB also available with two DP to DVI-D SL adapters

NVIDIA NVS 315

Added flexibility for 2 display business graphics

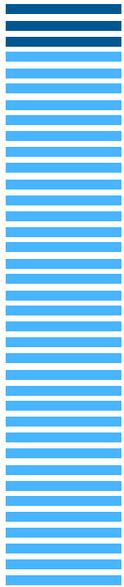
CUDA Cores	48
GPU	GF119-825
GPU Memory	1GB DDR3
Form Factor	Single Slot, 5.70" x 2.713"
PCIe	Gen 2.0 x16
Display Connectors	DMS-59
Max Display Configuration	2x 1920 x 1200 at 60Hz
Max Board Power	19.3 W
DVI-I Single Link or VGA	2 via Adapter
DisplayPort	2 via adapter
NVIEW	Yes
Mosaic	Windows 10, 8.1, 8, 7
Thermal Solution	Active Fansink
MSRP	\$149 DVI \$149 DP
PNY Part Number	VCNVS315DVI-PB ¹



¹Shown here, PNY PN VCNVS315DP-PB also available with a DMS-59 to dual DisplayPort adapter

NVIDIA NVS 310 v2 and 315

Competitive advantage over Integrated Graphics



Integrated Graphics	
▪	Steals system memory
▪	Resources constrained
▪	Diminished responsiveness



Memory Headroom

Dedicated Graphics	
▪	NVS 310/315 adds 1 GB memory
▪	Resources available
▪	Increased responsiveness



NVIDIA NVS 510

Raising the bar for 4 display business graphics

CUDA Cores	192
GPU	GK107
GPU Memory	2GB DDR3
Form Factor	Single Slot, 6.30" x 2.713"
PCIe	Gen 2.0 x16
Display Connectors	4x mDP
Max Display Configuration	4x 3840 x 2160 at 30Hz
Max Board Power	35 W
Max Number of Frame Locked Displays	4
Max Boards Per System	3 Win 7 4 Win 10
Max Number of Mosaic Screens	16
Max Number of Windows Screens	12 Win 7 16 Win 10
Max Number of Linux Screens	16
Thermal Solution	Active Fansink
MSRP	\$449 DP \$499 DVI
PNY Part Number	VCNVS510DP-PB ¹



¹Shown here, PNY PN VCNVS510DVI-PB also available with four mDP to DP and four mDP to DVI adapters

NVIDIA NVS 510 Multi-Streaming

Maximum resolution per display when using multi-streaming

	Display 1	Display 2	Display 3	Display 4
Configuration 1	3840 x 2160 at 60Hz			
Configuration 2	2560 x 1600 at 120Hz			
Configuration 3	2560 x 1600 at 60Hz	2560 x 1600 at 60Hz		
Configuration 4	1920 x 1200 at 60Hz	1920 x 1200 at 60Hz	1920 x 1200 at 60Hz	
Configuration 5	1600 x 1200 at 60Hz	1600 x 1200 at 60Hz	1600 x 1200 at 60Hz	1600 x 1200 at 60Hz
Configuration 6	1920 x 1200 at 120Hz	1920 x 1200 at 120Hz		

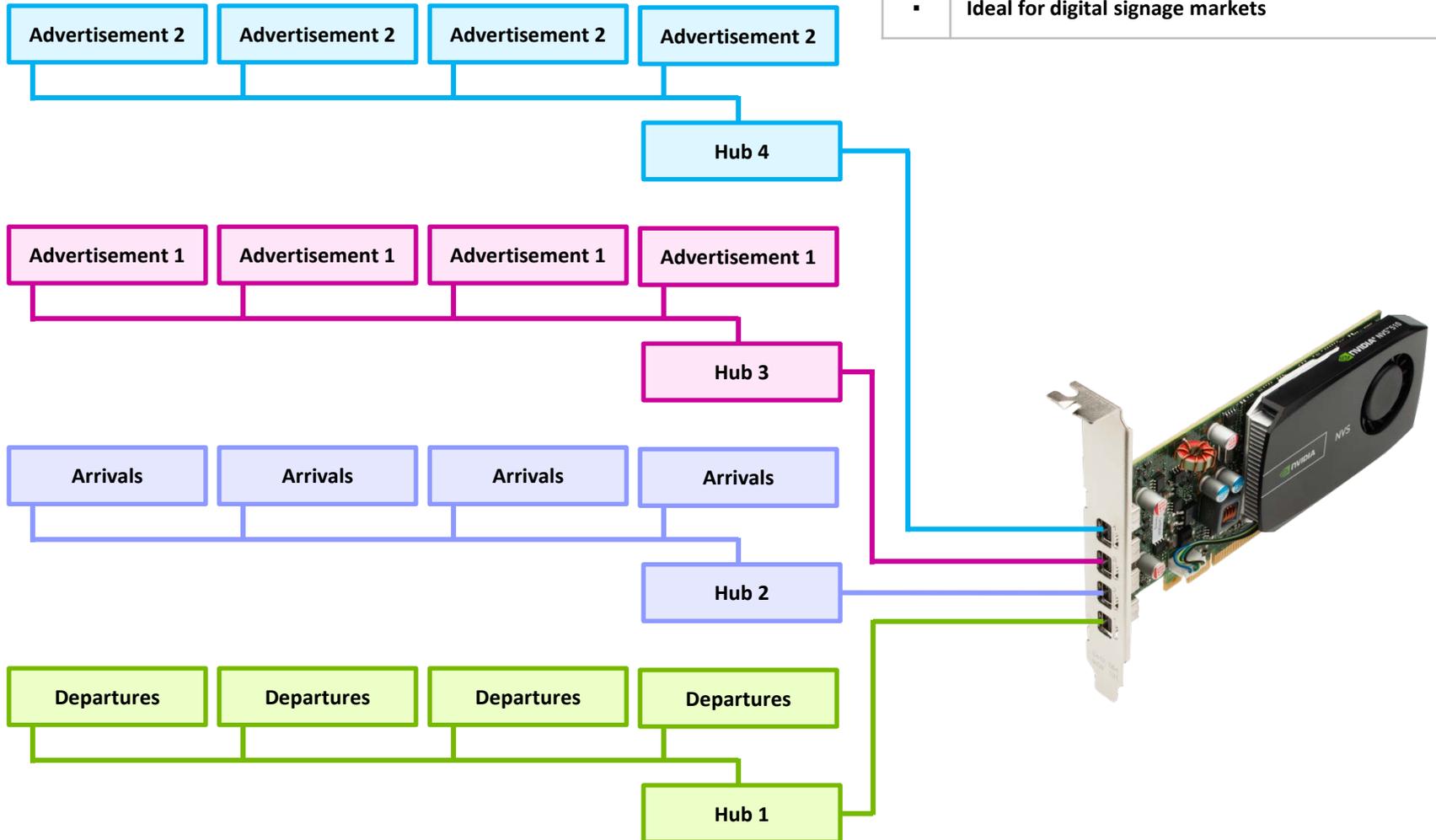
▪	DisplayPort bandwidth limits maximum resolution per display when using multi-streaming
▪	When not using multi-streaming each connector on the NVS 510 can support resolutions up to 3840 x 2560



NVIDIA NVS 510

DisplayPort 1.2 stream cloning and digital signage

- Allows 4 display heads to drive 16 displays
- Ideal for digital signage markets



NVIDIA NVS 510

Display connectivity matrix

	Monitor Connector and Display Cable Type				
	DisplayPort	DVI-D SL	VGA	DVI-D DL	HDMI
Recommended Option	mDP to DP Adapter ¹	mDP to DVI SL Adapter	mDP to VGA Adapter	mDP to DVI DL Adapter	mDP to HDMI Adapter



Exclusive NVIDIA patented locking mini-DisplayPort connectors

¹Four mDP to DP adapters are included with all NVS 510 shipments



NVIDIA NVS 810

Product positioning

- | | |
|---|---|
| ▪ | World's most capable display signage card providing the lowest cost per display driven and TCO |
| ▪ | Seamlessly drives 8 displays from a single card or combine cards together to form massive signage walls |
| ▪ | Advanced image management using Mosaic warp/blend/overlap and remote management with NVWMI toolkit |



NVIDIA NVS 810

Solves digital signage problems

Solutions cost is too expensive:

- Only solution to offer 8x 4K displays from a single slot board for less than \$100 per display
- Eliminates the need for additional systems and cards = lowest TCO

Creating and deploying solutions is complicated:

- Advanced image management with warp/blend/overlap, previously only available on high-end Quadro
- Proven NVIDIA Mosaic to create massive unified displays
- Remote monitoring and configuration with NVIDIA Enterprise Management Tools (NVWMI)

Other NVS 810 benefits include:

- Latching mDP connector ensures reliability and signal integrity
- Multi-stream decode and playback of H.264



NVIDIA NVS 810

Unprecedented 8 display business graphics solution

CUDA Cores	1024 (512 x 2)
GPU	GM107 x 2
GPU Memory	4GB DDR3 (2GB per GPU)
Form Factor	Single Slot, 9.5" x 4.4"
PCIe	Gen 3.0 x16
Display Connectors	8x mDP
Max Display Configuration	8x 4K at 30Hz
Max Board Power	68W
Max Number of Frame Locked Displays	8
Max Boards Per System	3 Win 7 4 Win 10
Max Number of Mosaic Screens	16
Max Number of Windows Screens	24 Win 7 32 Win 10
Max Number of Linux Screens	32
Thermal Solution	Active Fansink
MSRP	\$849 DP \$889 DVI
PNY Part Number	VCNVS810DP-PB ¹



¹Shown here, PNY PN VCNVS810DVI-PB also available with 8 mDP to DVI-D SL adapters

NVIDIA NVS 810

Display connectivity matrix

	Monitor Connector and Display Cable Type				
	DisplayPort	DVI-D SL	VGA	DVI-D DL	HDMI
Recommended Option	mDP to DP Adapter ¹	mDP to DVI SL Adapter ²	mDP to VGA Adapter	mDP to DVI DL Adapter	mDP to HDMI Adapter



Exclusive NVIDIA patented locking mini-DisplayPort connectors

¹Eight mDP to DP adapters are included with all VCNVS810DP-PB shipments ²Eight mDP to DVI SL adapters are included with all VCNVS810DVI-PB shipments



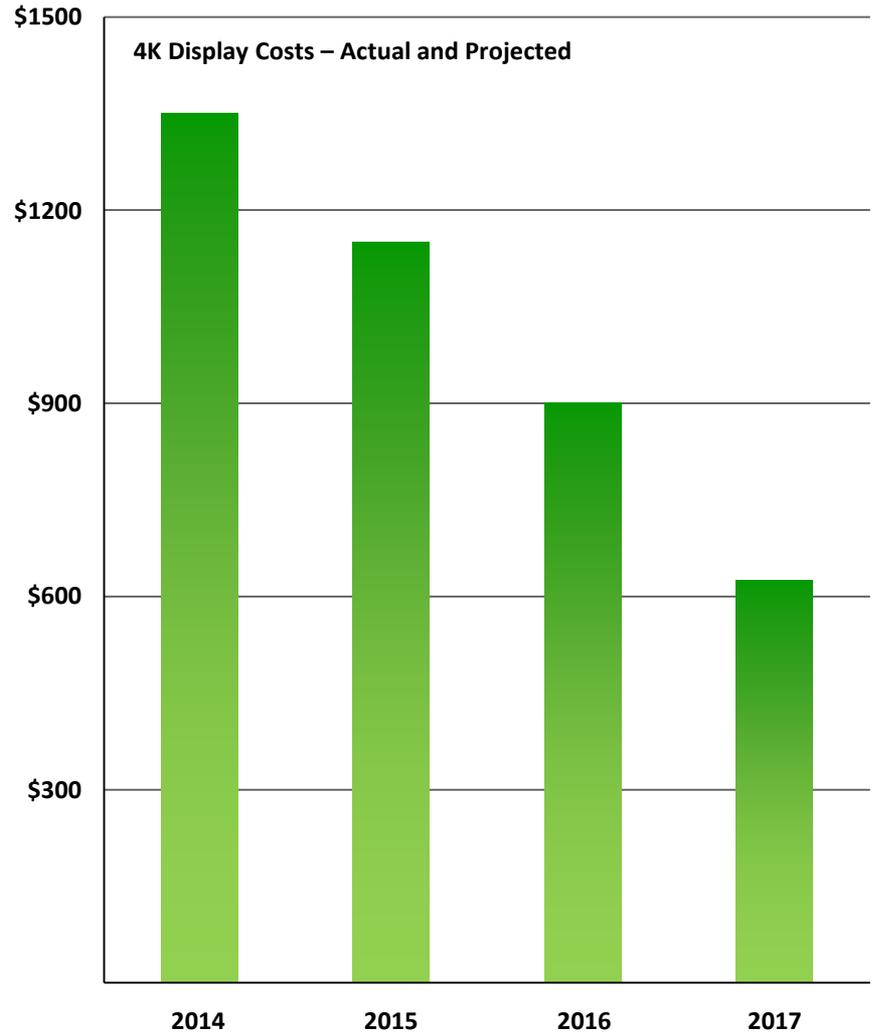
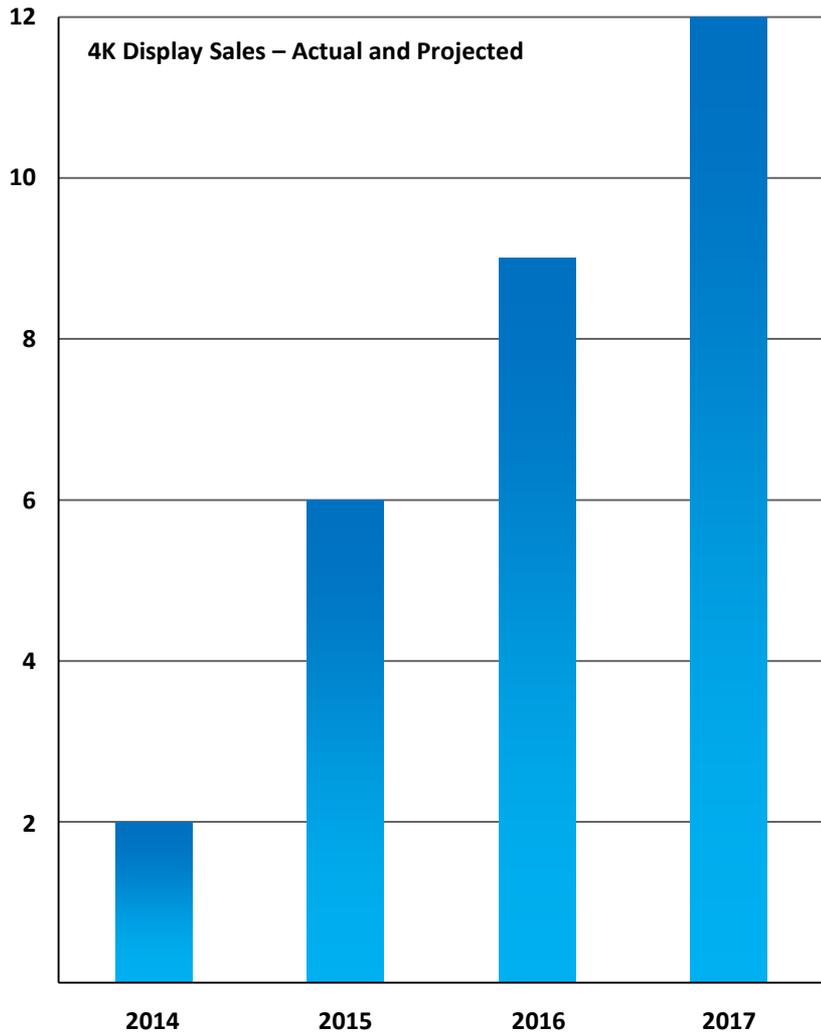
NVIDIA NVS 810

Drives eight 4K displays simultaneously



4K Display Sales Trends

Shipments are growing rapidly while prices continue to fall¹



¹ Source: 2014 DisplaySearch an NPD Group Company.

NVIDIA NVS

4K multi-display support

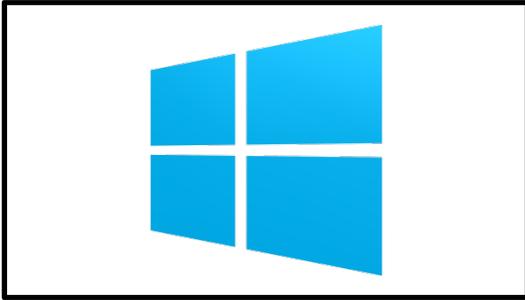
NVS 810	8 Overlap + Bezel Correction	16 Bezel Correction	24 Bezel Correction	32 Bezel Correction
NVS 510	4 Overlap + Bezel Correction	8 Overlap + Bezel Correction	12 Bezel Correction	16 Bezel Correction

NVIDIA NVS 810 provides highest density and lowest TCO (Total Cost of Ownership)



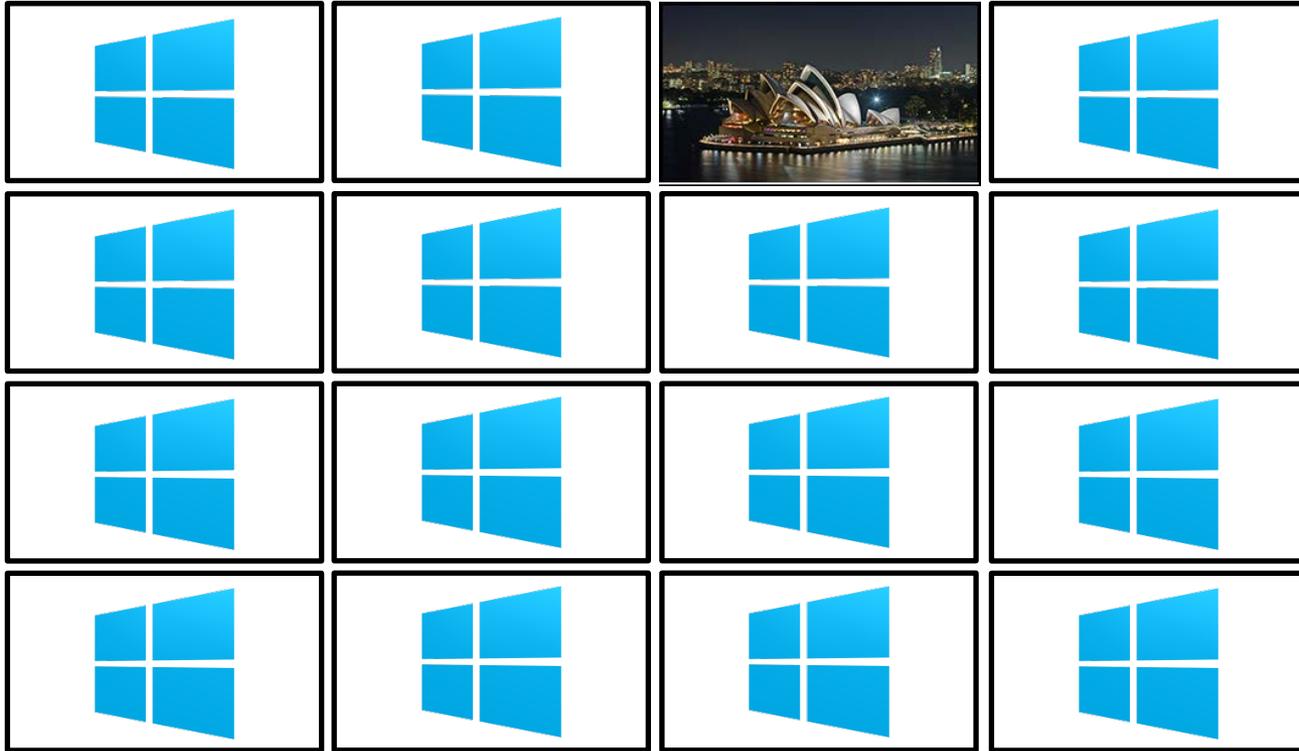
NVIDIA Mosaic: Why is it Necessary?

Windows on its own presents independent desktops



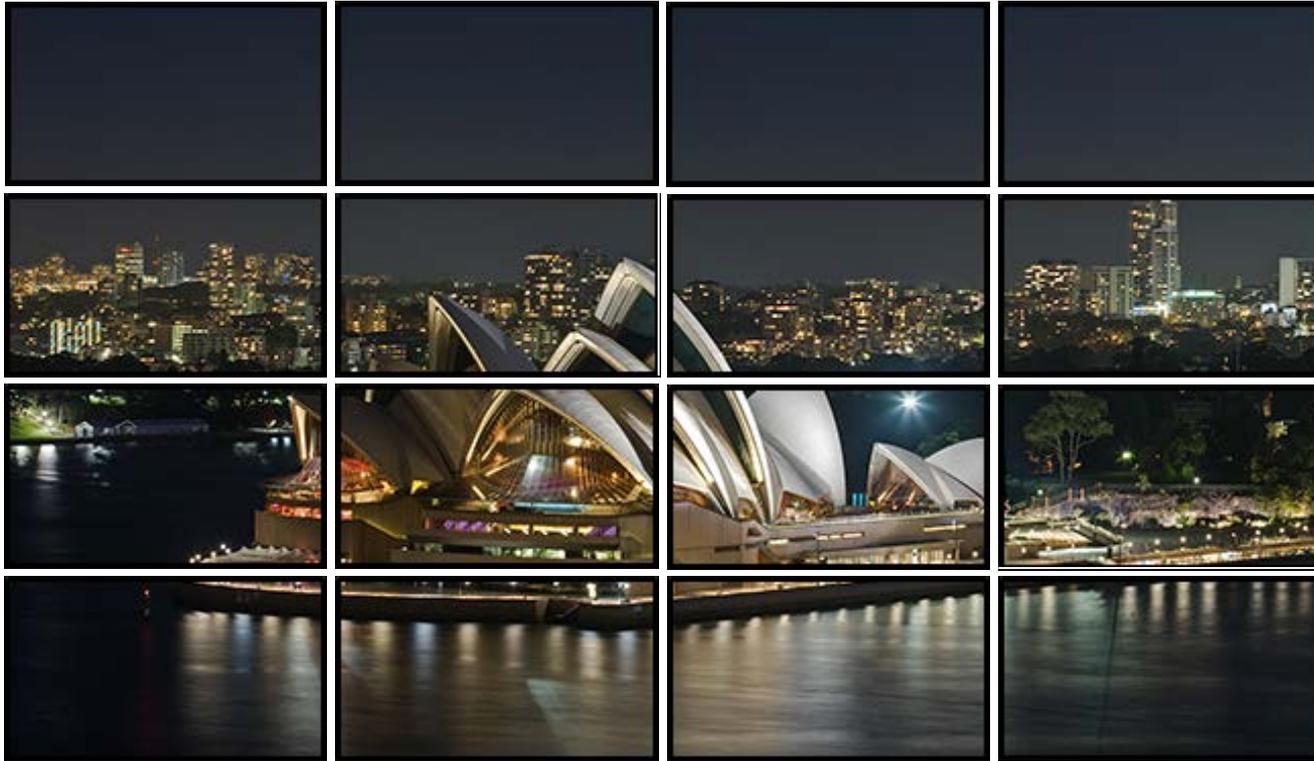
Windows Presents Independent Desktops

Even when used with multiple GPUs



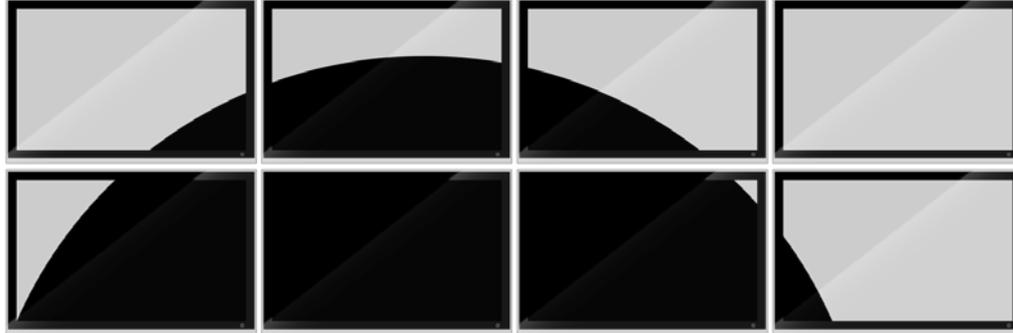
NVIDIA NVS 810 with Mosaic

One large logical desktop without complexity or app modification

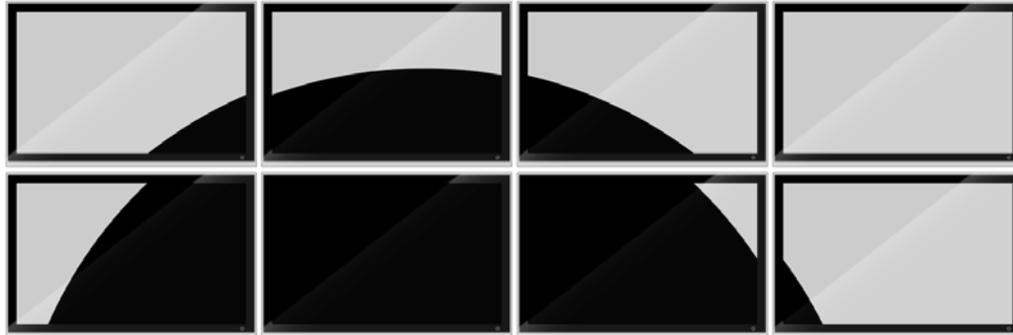


Bezel Correction

Image looks continuous by rendering under the bezel



With Bezel Correction

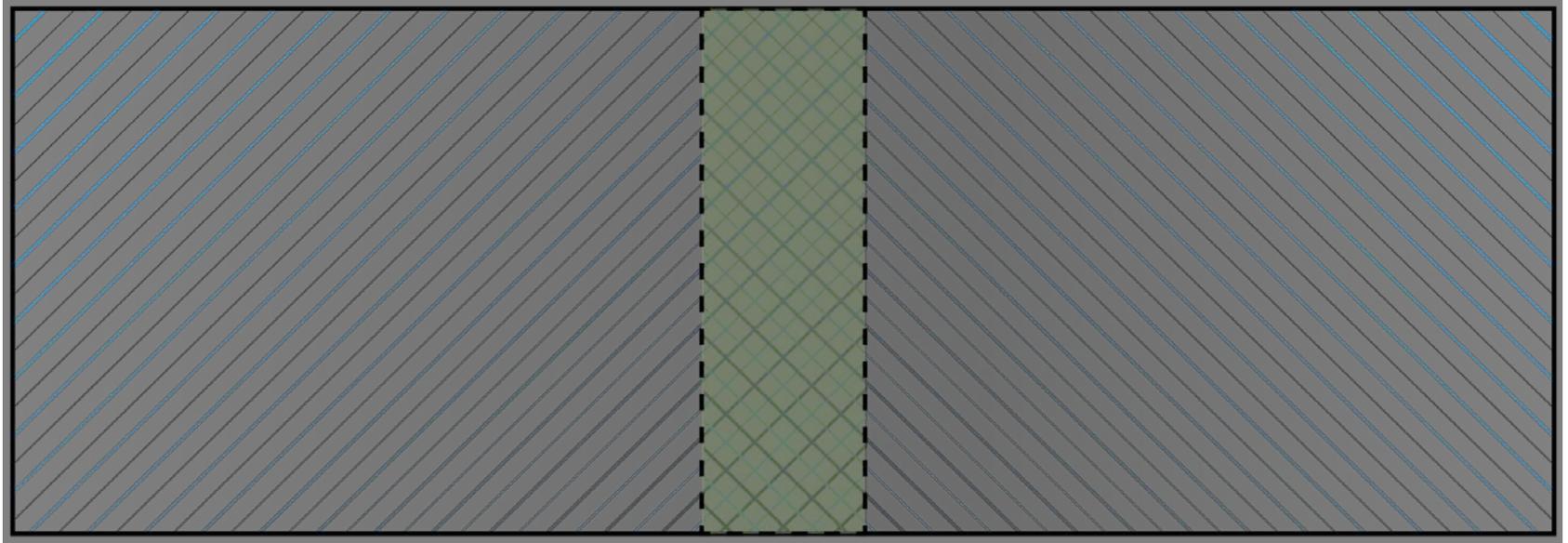


No Bezel Correction



Projector Overlap Correction

Maintains proper aspect ratio and more...



Projector Overlap

Compensates for geometry and brightness differences between projectors to present a visually seamless image | These are known as Warp (geometry corrections) or Blend (intensity adjustments) | Mosaic + Quadro Sync compatible products have the graphics and compute performance necessary to make these adjustments in real-time.



Mosaic Scalability

NVIDIA NVS 810 and 510 at 4K resolution¹

	Number of displays from a single system with Mosaic				
	Up to 2	Up to 4	Up to 8	Up to 12	Up to 16
NVS 810	1 Board	1 Board	1 Board	2 Boards	2 Boards
NVS 510	1 Board	1 Board	2 Boards	3 Boards	4 Boards

NVS 810 reaches 16 display Mosaic limit with only two boards



¹For use case scenarios where Quadro Sync multi-board synchronization is not required.



NVIDIA NVS Driver Features

Simplifies development and deployment

Custom Resolutions	Mosaic	Tiled Displays	10- and 12-bit Color
GFT, DMT, CVT, CVT-RB, Manual timing	Seamless desktop across multiple GPUs	Automatic Mosaic setup on tiled displays using DisplayID	Support High Dynamic Range (HDR) displays
EDID Management	Ultra High Resolution Desktop	4K Resolution	DisplayPort MST
Capture and read EDID from file	Up to 16k by 16k	DP 1.2 or HDMI 1.4B connectors or later	Support for multi-streaming devices
Warp + Intensity API	NVAPI	Display Clone Modes	GPU Affinity
Edge-blending and projection mapping for Windows or Linux	Programmatically control driver	DisplayPort clone, Pan and Scan clone, 4K cloning	Multi-GPU support and Swap Groups
8K e-Shift Support	Mosaic Confidence Monitor	NVWMI	
Native support for 8K e-shift projector	Smart clone features	Scripting, event monitor, remote setup	



NVIDIA Enterprise Tools | Simplified IT Management



Profiles	Desktop Layout	Displays
Clocks	Temperature	State
GPU	Driver	NVIEW
And much more...		



NVIDIA NVS

Which NVS board do you need?

	NVS 310 v2	NVS 315	NVS 510	NVS 810
Dedicated Graphics Memory	1GB DDR3		2 GB DDR3	4 GB DDR3 (2GB per GPU)
Low Power Consumption	Up to 20 W	Up to 20 W	Up to 35 W	Up to 68 W
Thermal Management	Low Acoustics Footprint Active Fansink			
System Interface	PCIe Gen 2.0 x16			PCIe Gen 3.0 x16
System Enclosure Type	Small Form Factor (SFF) or Standard Height (ATX)			Standard Height (ATX)
Display Output(s)	2x DP 1.2, DVI SL or HDMI	2x DP 1.2, DVI SL or VGA	4x DP 1.2, DVI SL or HDMI	8x mDP 1.2, DVI SL or HDMI
Max Displays (Directly Attached)	2		4	8
Display Tools and Technology	NVIDIA NVIEW Desktop Management Software and NVIDIA Mosaic Technology			
Enterprise Management Tools	Remote Management of Graphics and Display Settings and Driver Installation Tools			

Drive 1 or 2 DisplayPort or DVI displays, balanced mix of power and performance features	Drive 1 or 2 DVI, VGA, or DisplayPort displays, good mix of power and performance features	Drive 1 - 4 DisplayPort, DVI, or HDMI displays, great mix of power and performance features	Drive 1 - 8 DisplayPort, DVI, or HDMI displays, ultimate mix of power and performance features
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PNY's Service and Commitment

1	3 year warranty
2	Pre-sales support and configuration assistance
3	Support for all workstation brands and complex installations
4	Advanced replacement for mission-critical deployments
5	Dedicated Quadro Field Application Engineers
6	U.S. 800 number hotline and email technical support
7	Support escalation for prompt issue resolution
8	Certified software support and bug reporting
9	Published product support and training materials
10	All necessary accessories and driver software included



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