

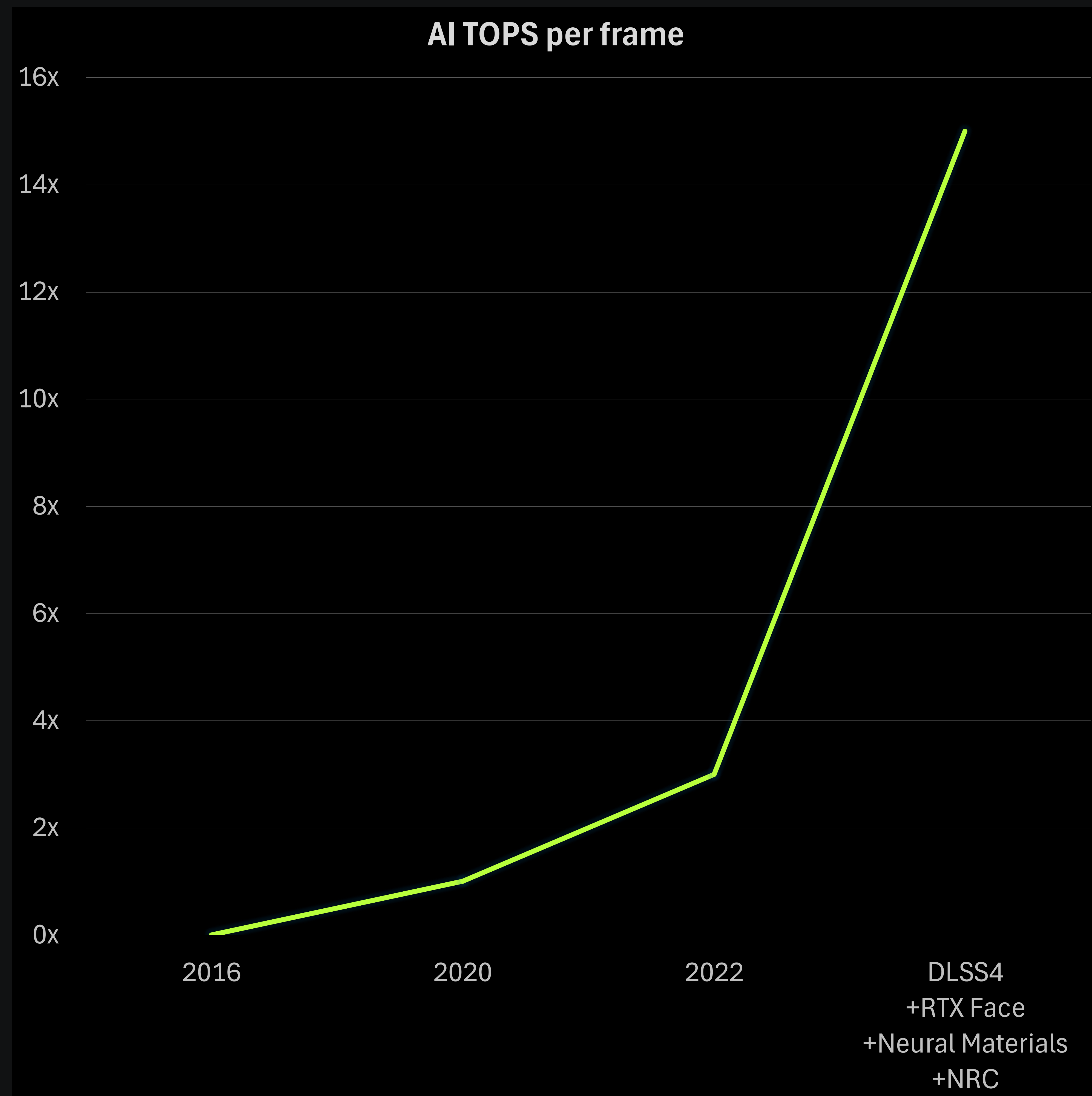
The background features a dark, starry space scene in the upper left corner, transitioning into a series of overlapping, wavy, green and yellow-green bands that create a sense of depth and movement. A solid green vertical bar is located on the far left edge.

Blackwell Architecture

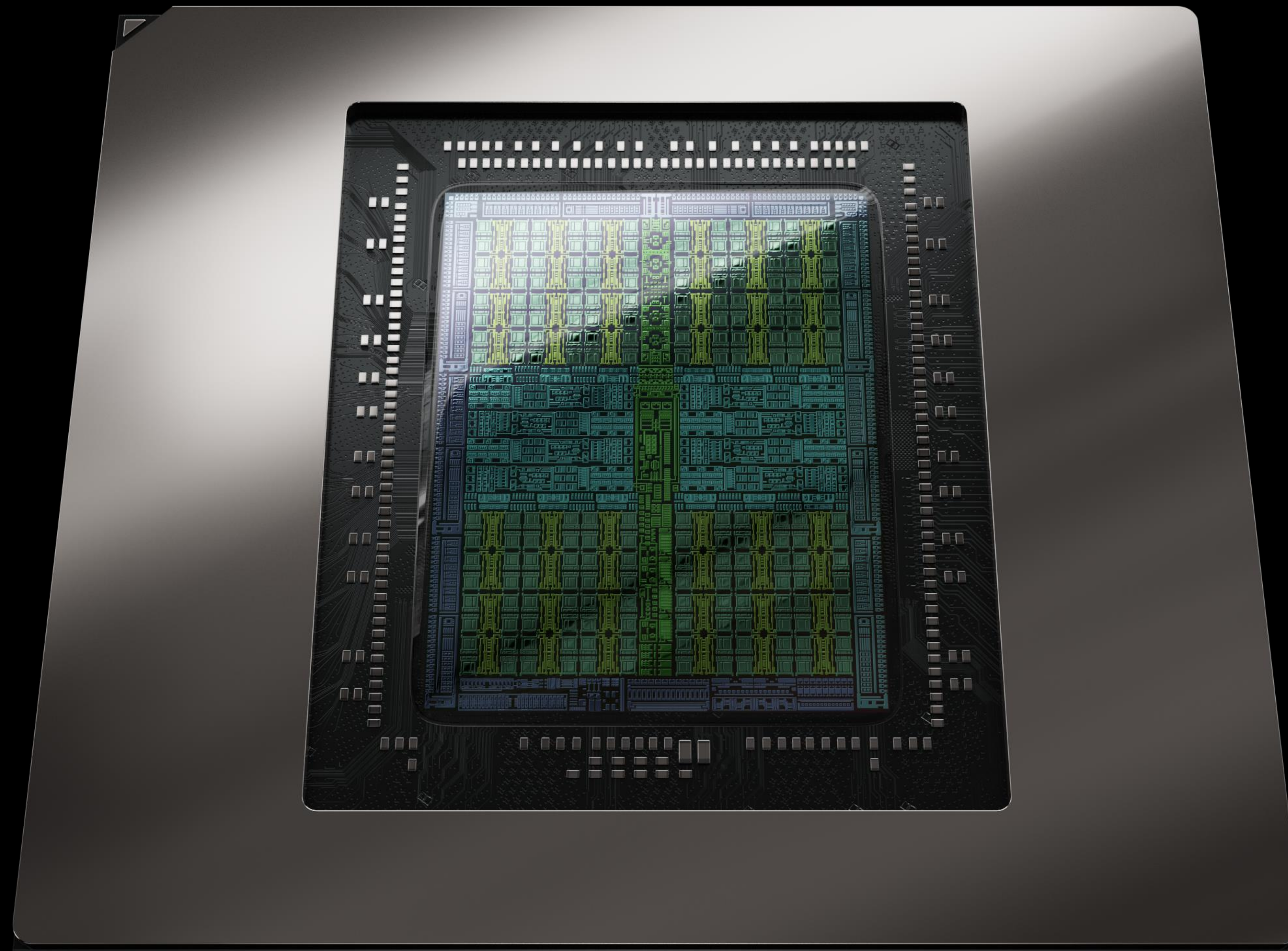
**The Challenge:
Increasing Visual Quality
at the End of Moore's Law**



The Solution: Neural Rendering

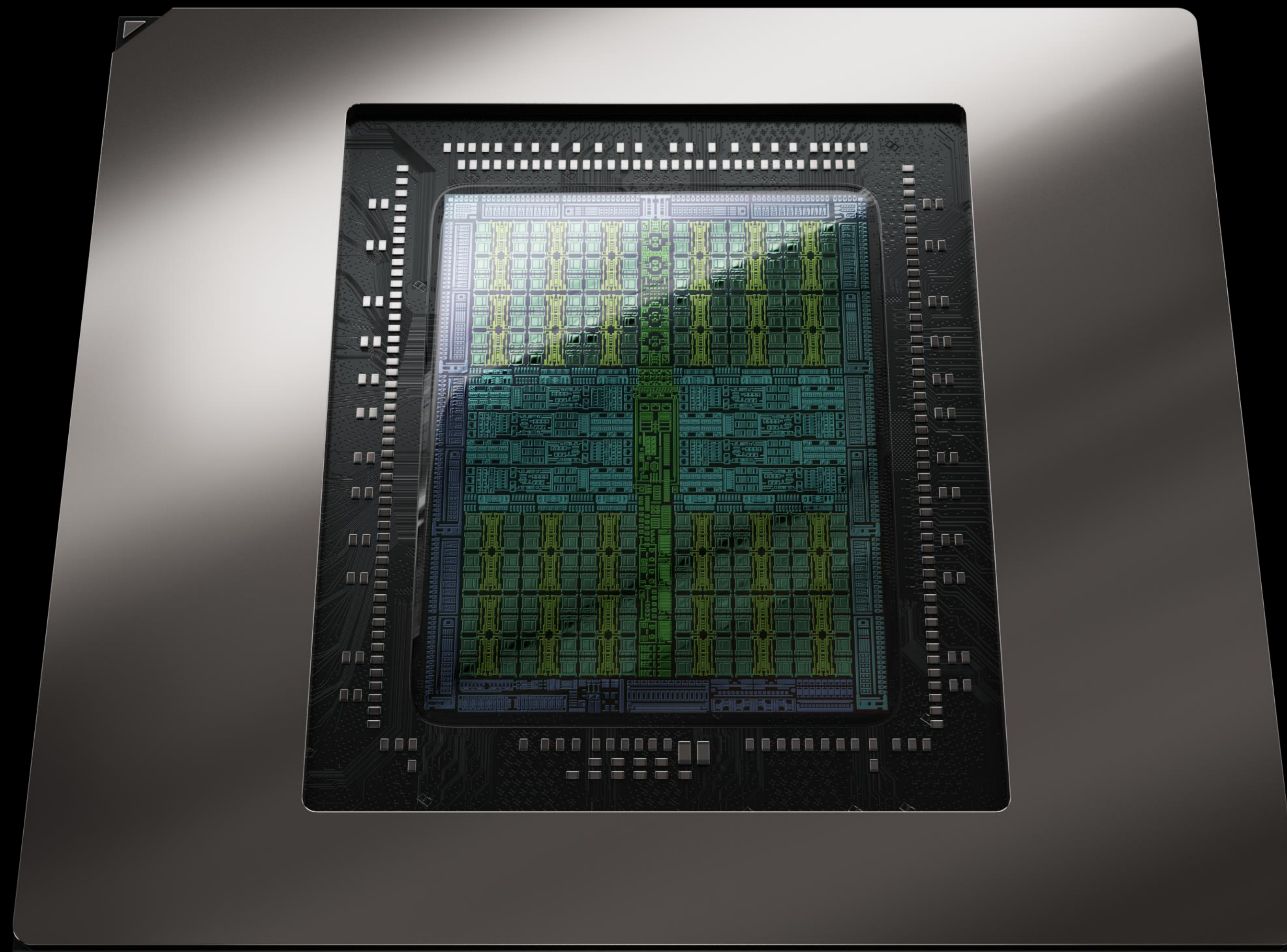


RTX Blackwell Design Goals



- Optimize for new neural workloads
- Reduce memory footprint
- New quality of service capabilities
- Energy efficiency

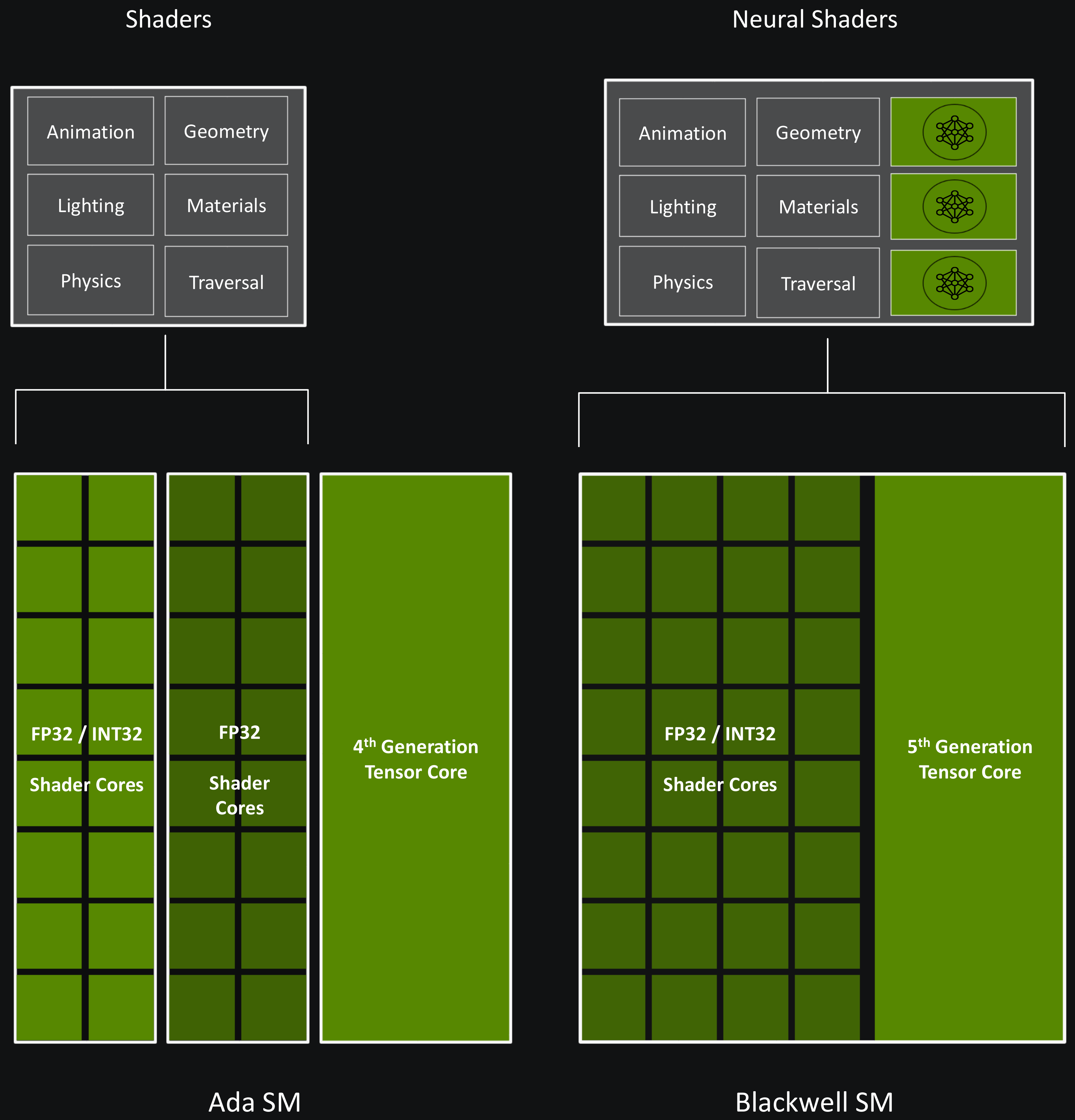
NVIDIA GeForce Blackwell Neural Rendering Architecture



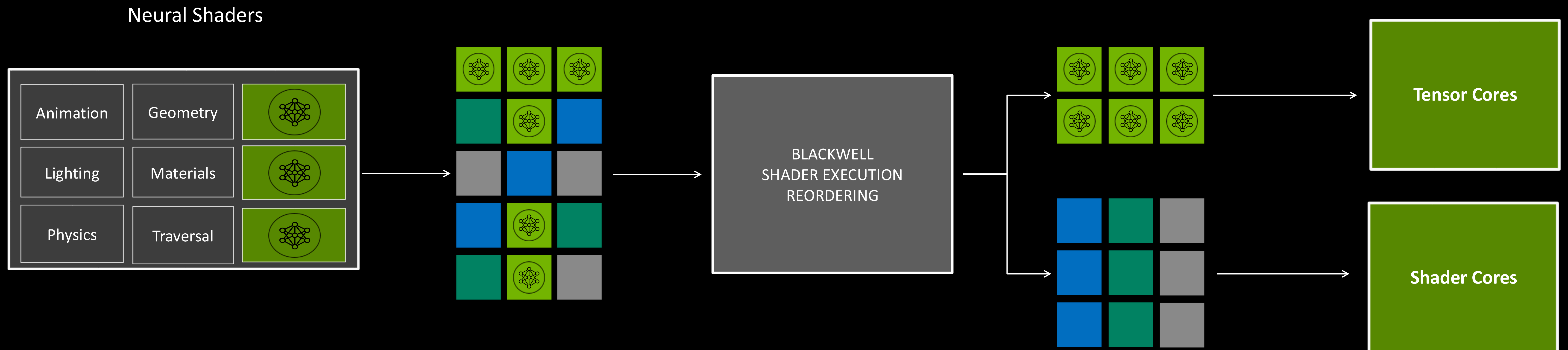
- **5th GEN TENSOR CORES**
4,000 AI TOPS | High Speed FP4
- **4th GEN RT CORES**
360 RT TFLOPS | Built for Mega Geometry
- **AI MANAGEMENT PROCESSOR**
Simultaneous AI Models + Graphics
- **BLACKWELL SM**
125 TFLOPS | Built for Neural Shaders
- **BLACKWELL MAXQ**
2X Power Efficiency
- **G7 MEMORY**
30 Gbps | World's Fastest

Displayport 2.1 UHBR20 | PCIe Gen 5 | 4X NVDEC, 4X NVENC with 4:2:2

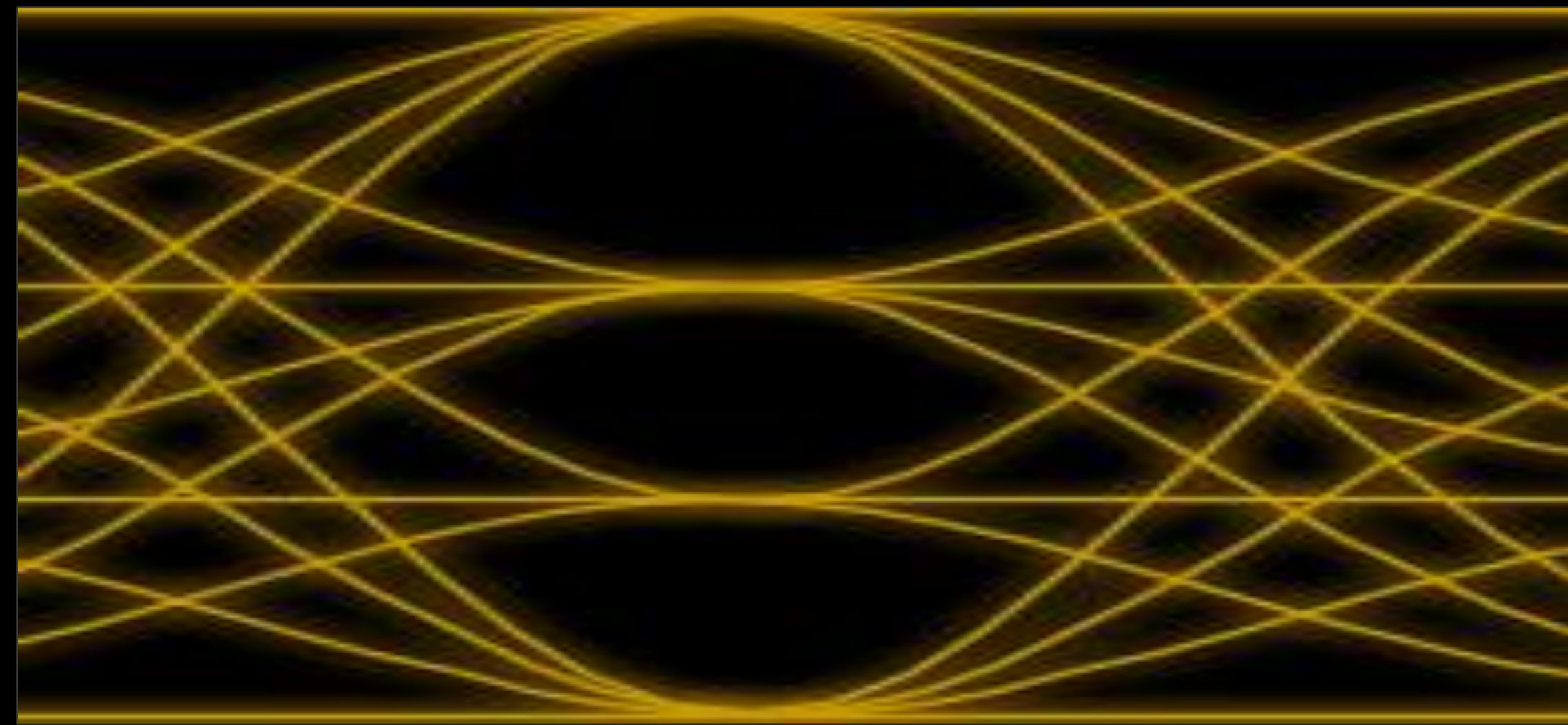
Blackwell SM: Built for Neural Shaders



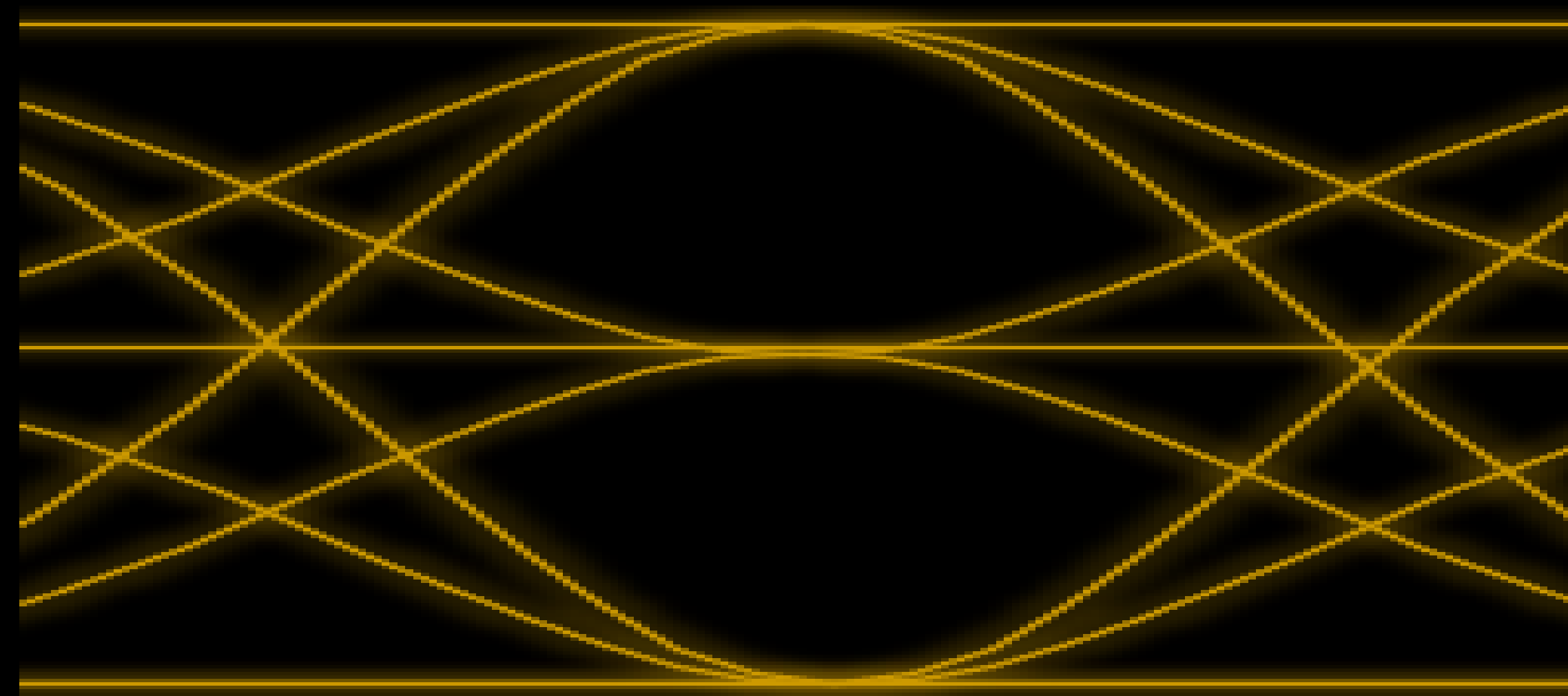
Blackwell SM Improves SER by 2X



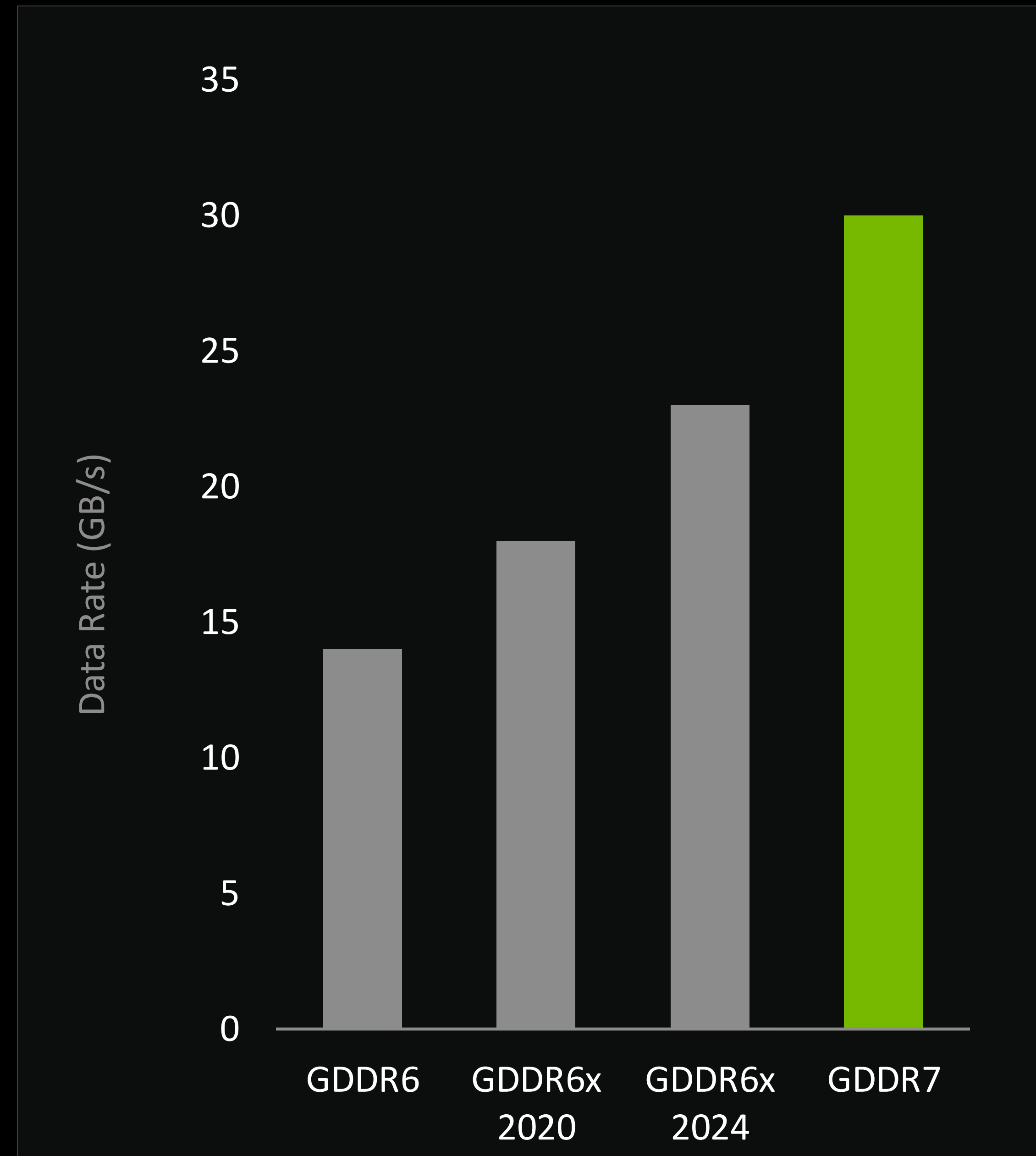
GDDR7: The New Graphics DRAM Standard



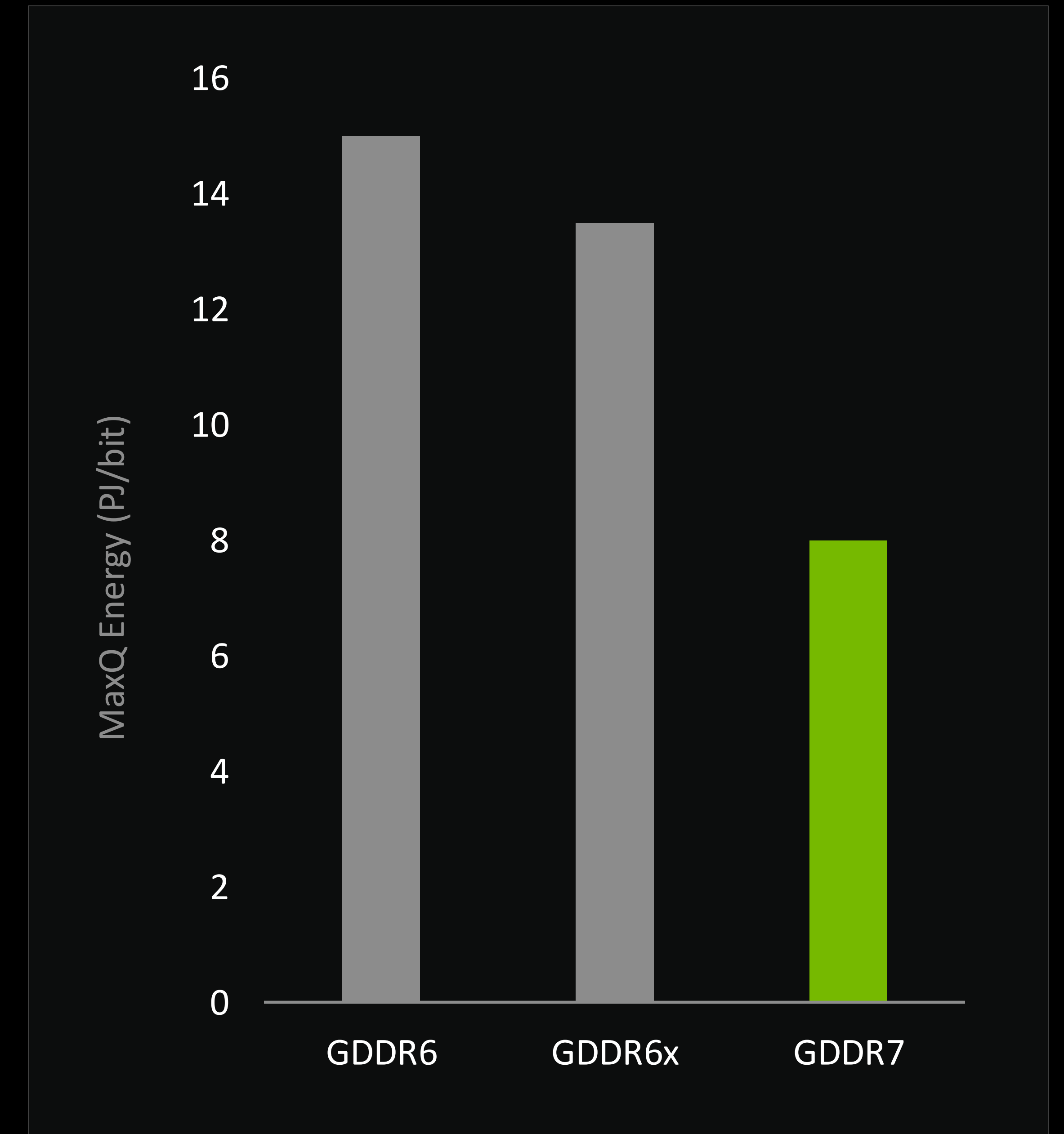
GDDR6x: Pam4



GDDR7: Pam3
Higher Frequency, Lower Voltage



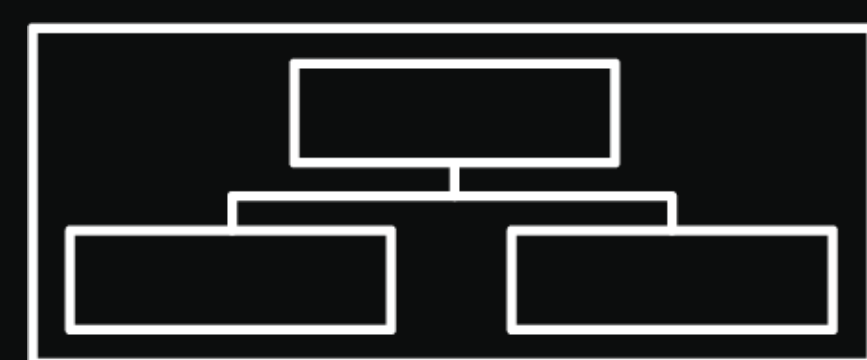
2X Data Rate of G6



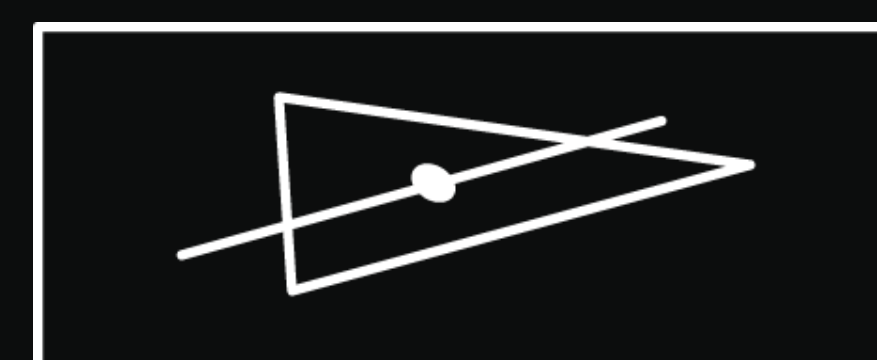
2X Efficiency

Energy Efficiency reflects the average graphics application with 30% DRAM utilization

Blackwell 4th Generation RT Core—Built for Mega Geometry



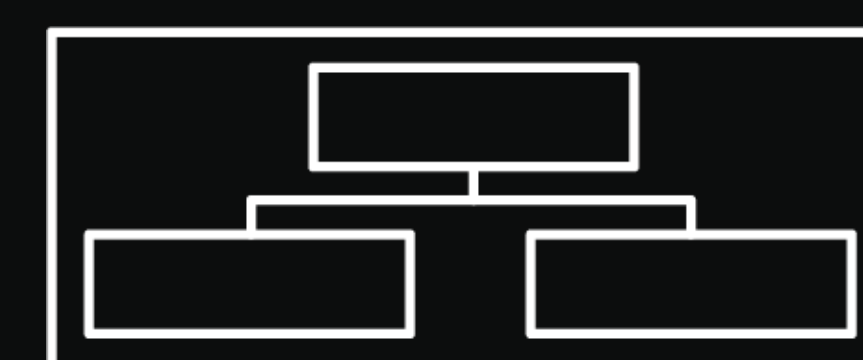
Box Intersection Engine



Triangle Intersection Engine



Opacity Micromap Engine



Box Intersection Engine



Triangle Cluster Intersection Engine



Linear Swept Spheres



Opacity Micromap Engine

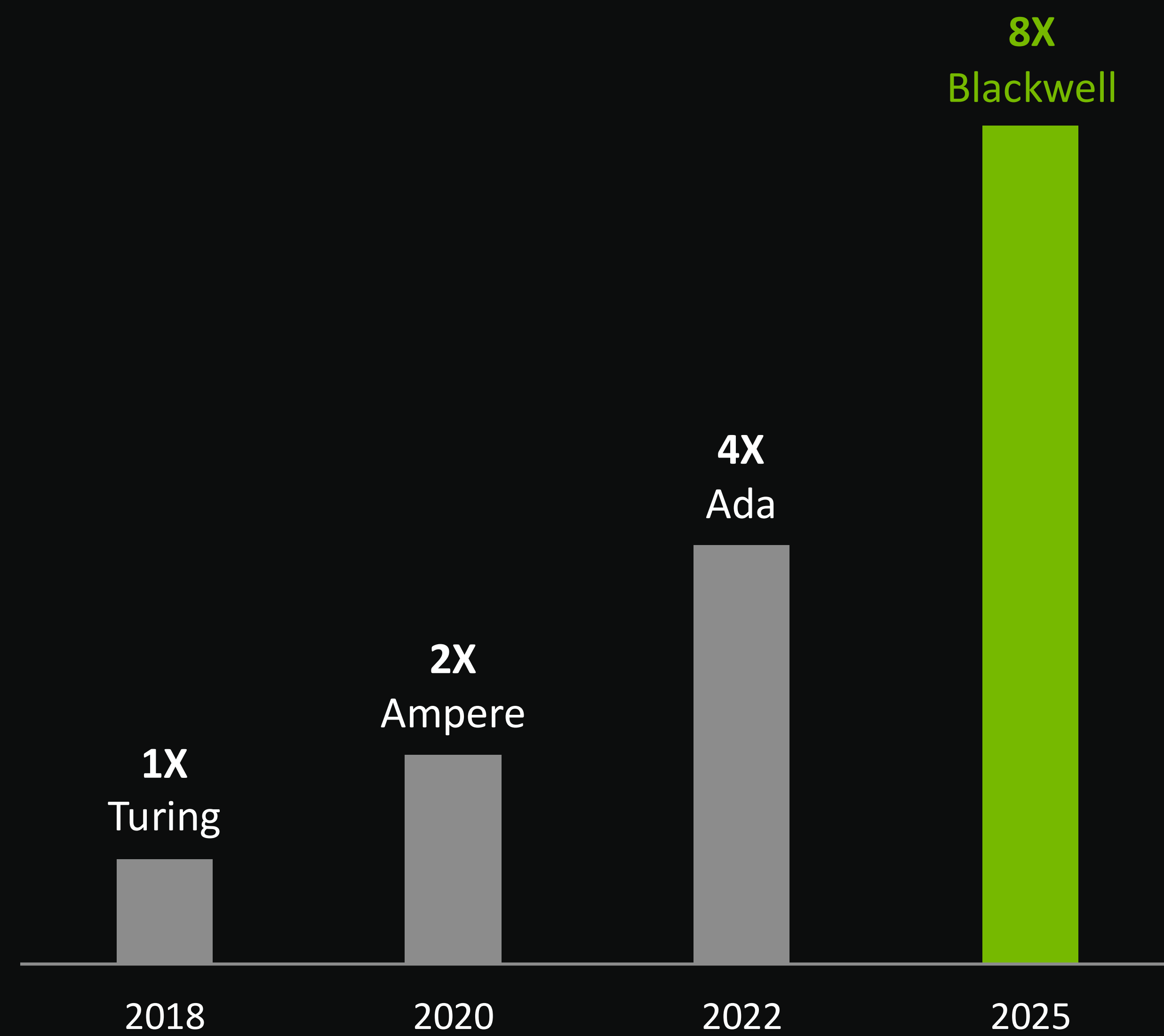


Triangle Cluster Decompression Engine

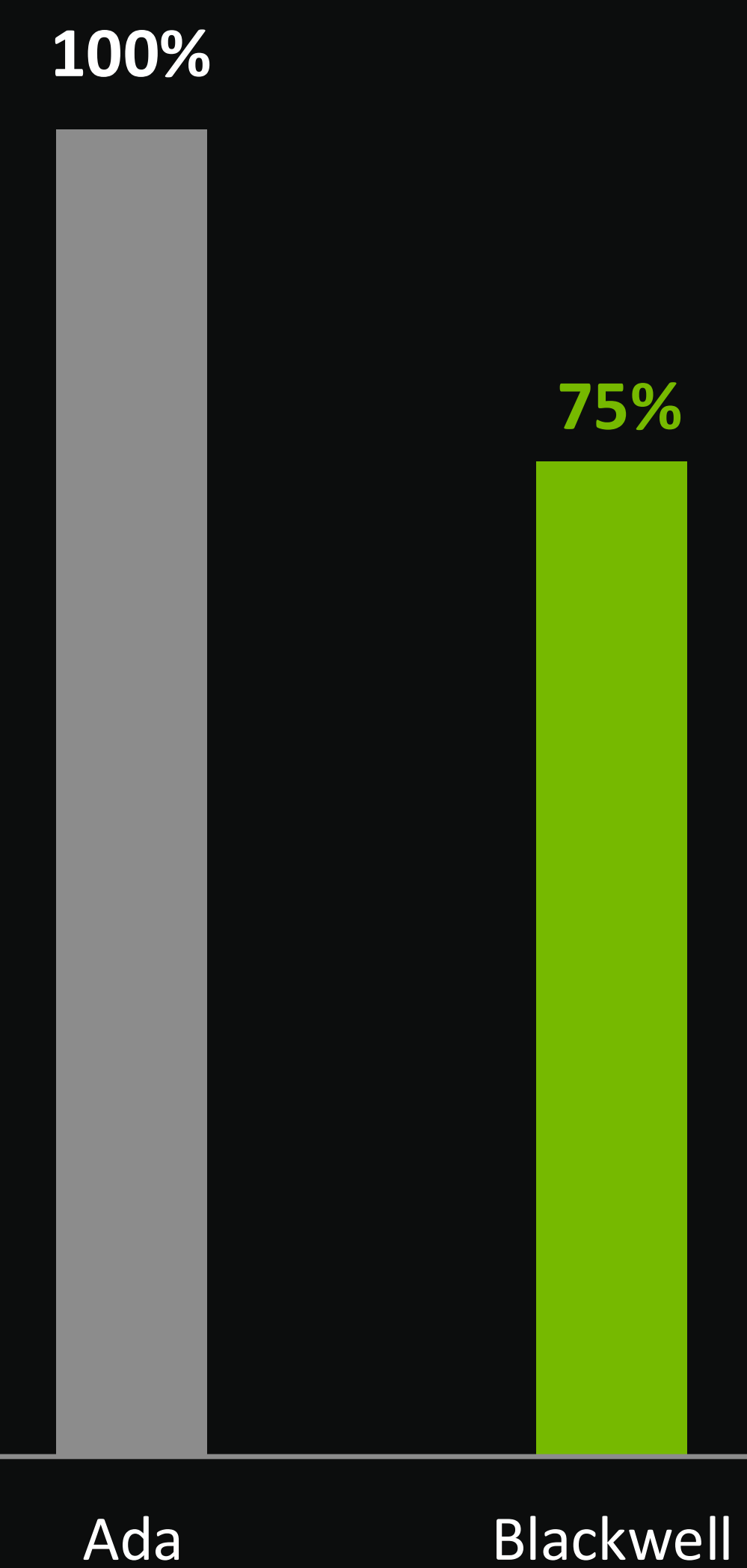
Ada 3rd Generation RT Core

Blackwell 4th Generation RT Core

Blackwell 4th Generation RT Core—Built for Mega Geometry

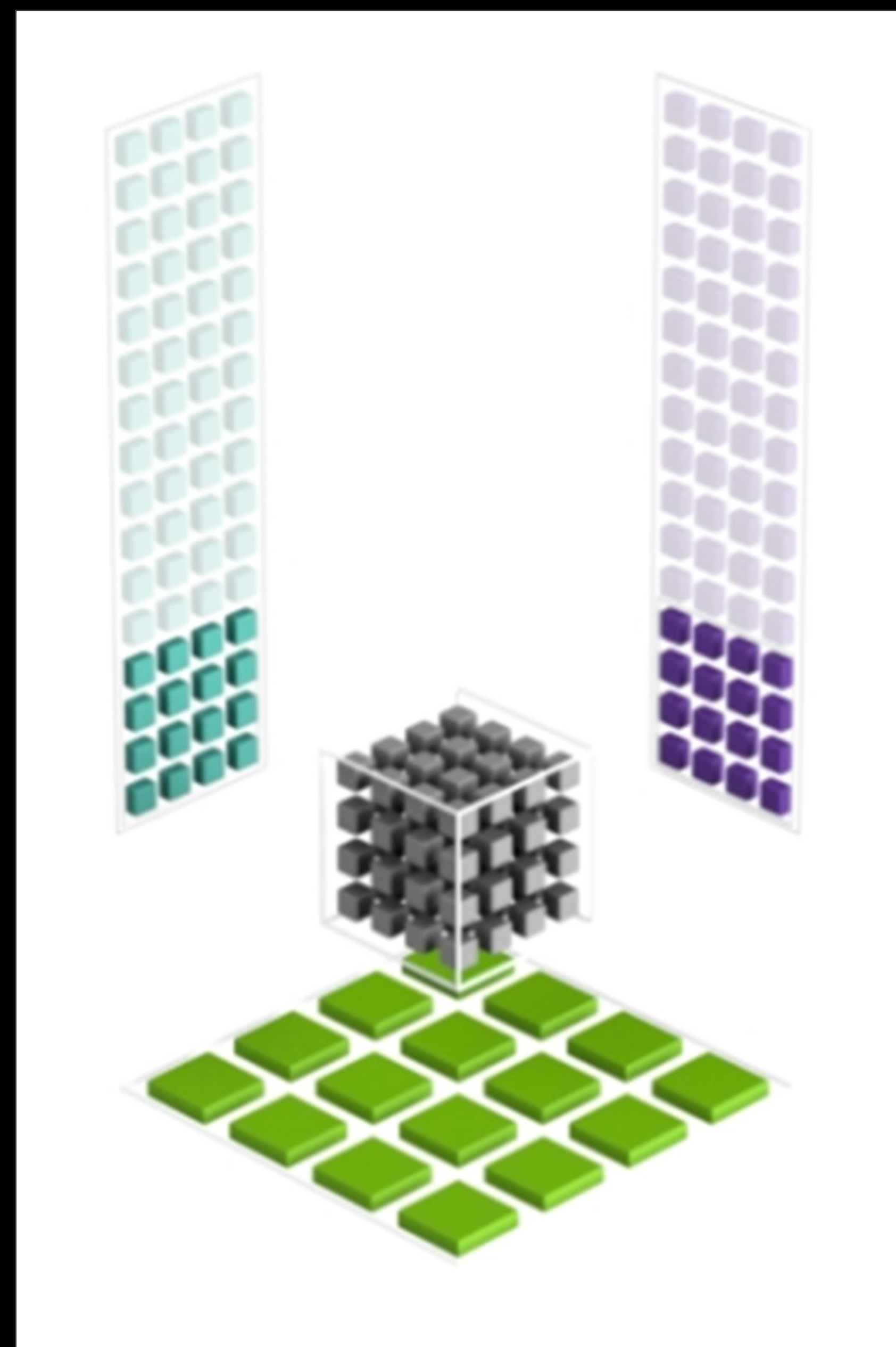


8x Ray Triangle Intersection Rate

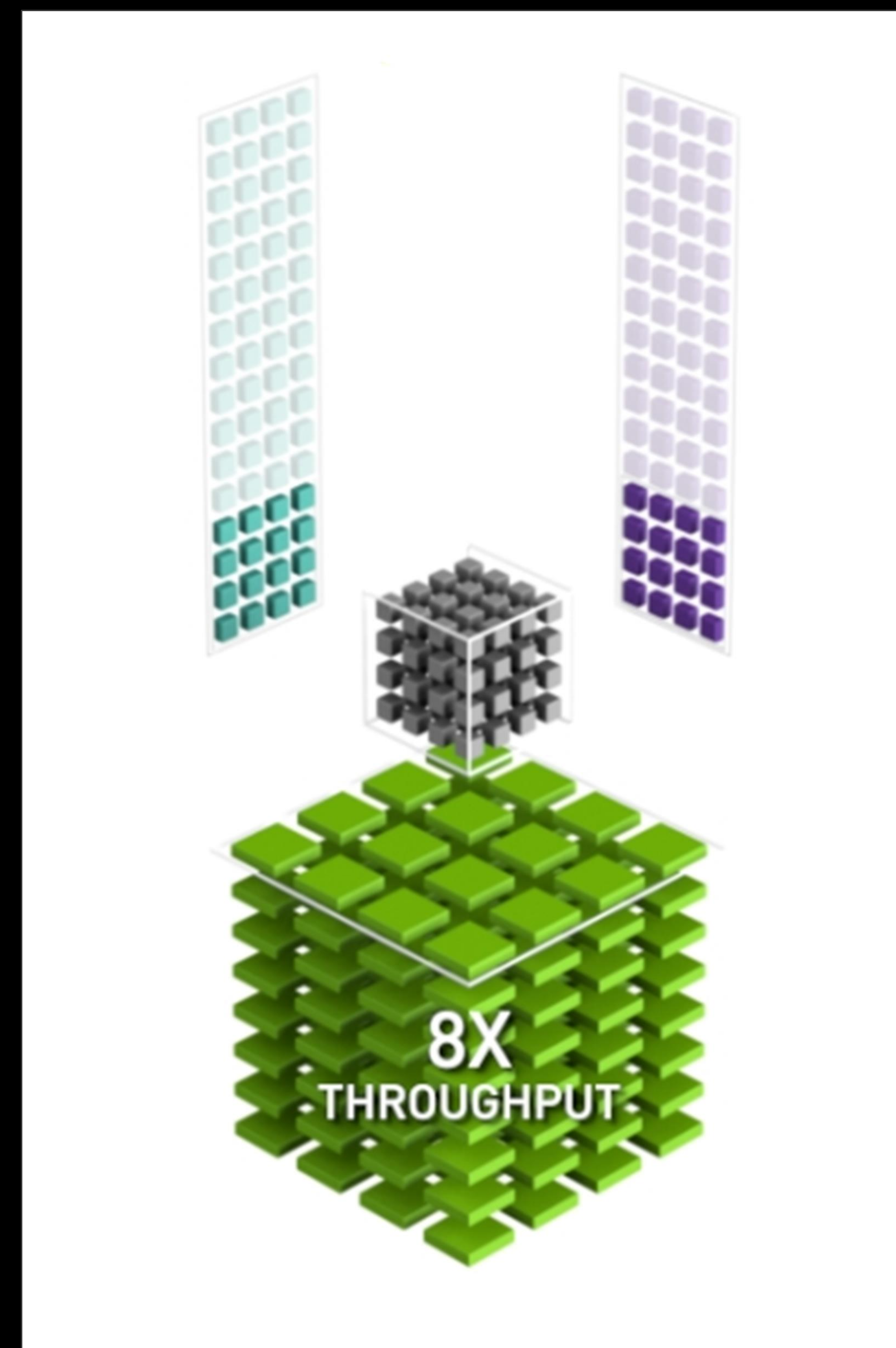


75% Memory Footprint

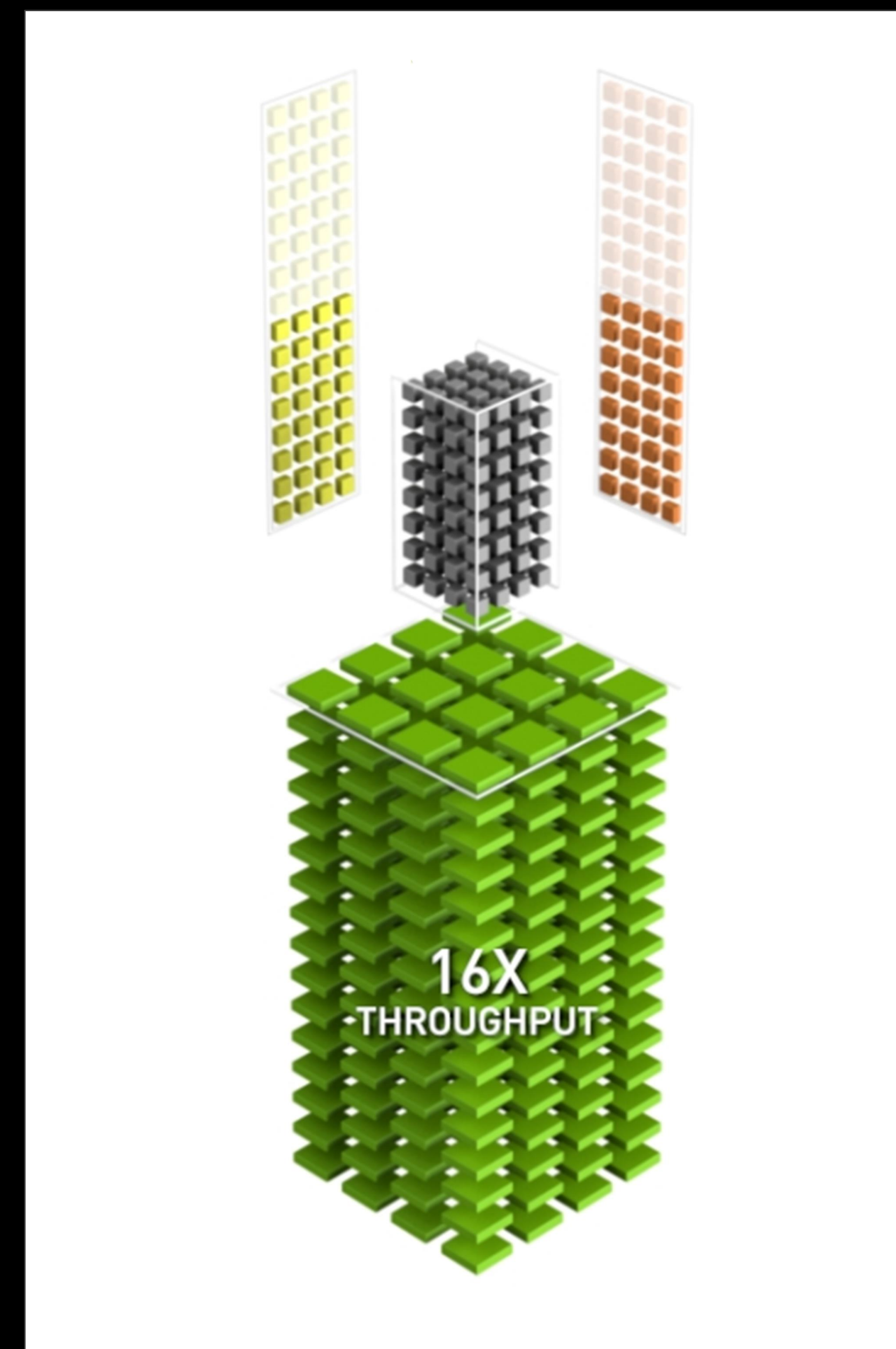
Blackwell 5th Generation Tensor Cores with FP4



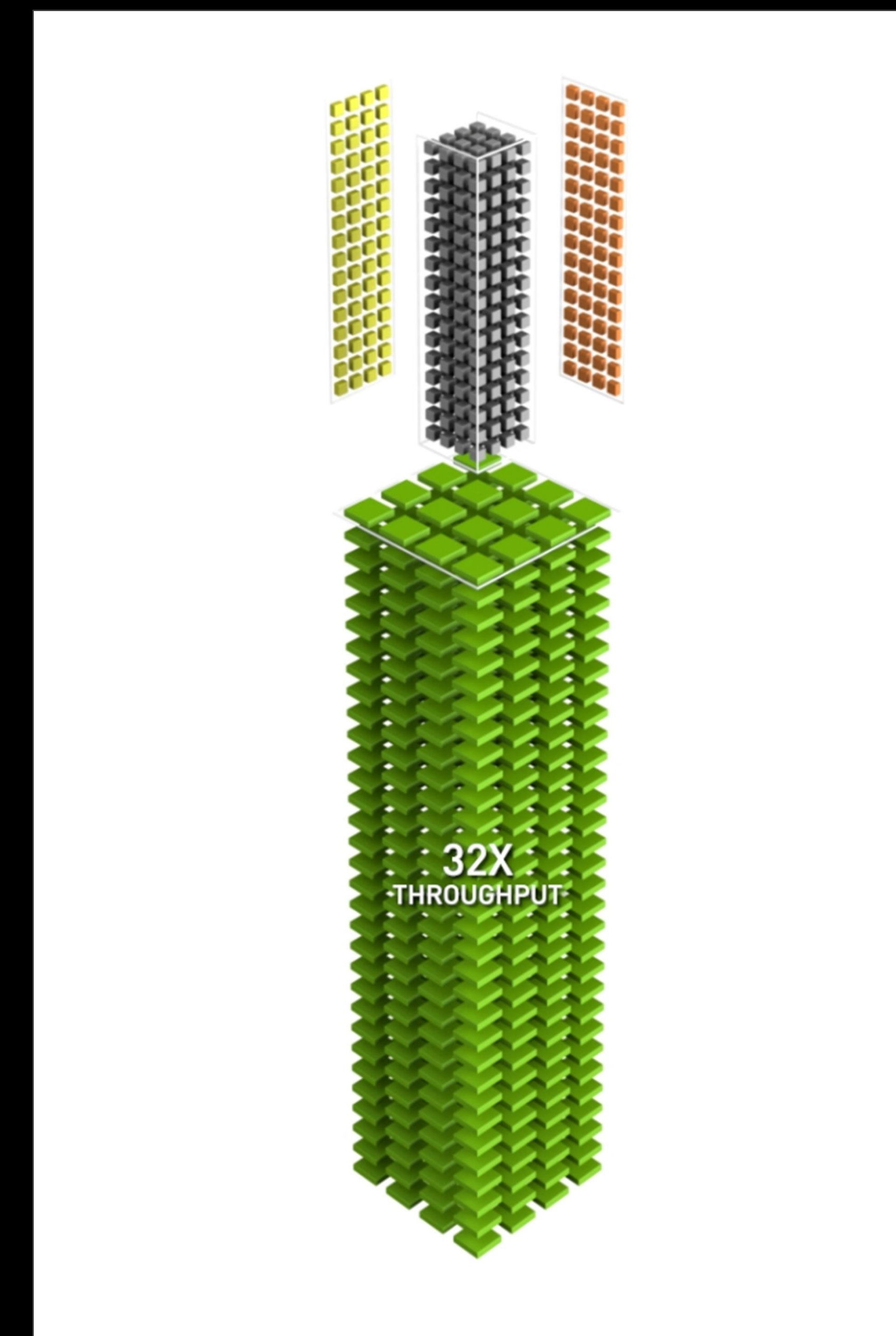
Pascal



Turing Tensor Core
FP16

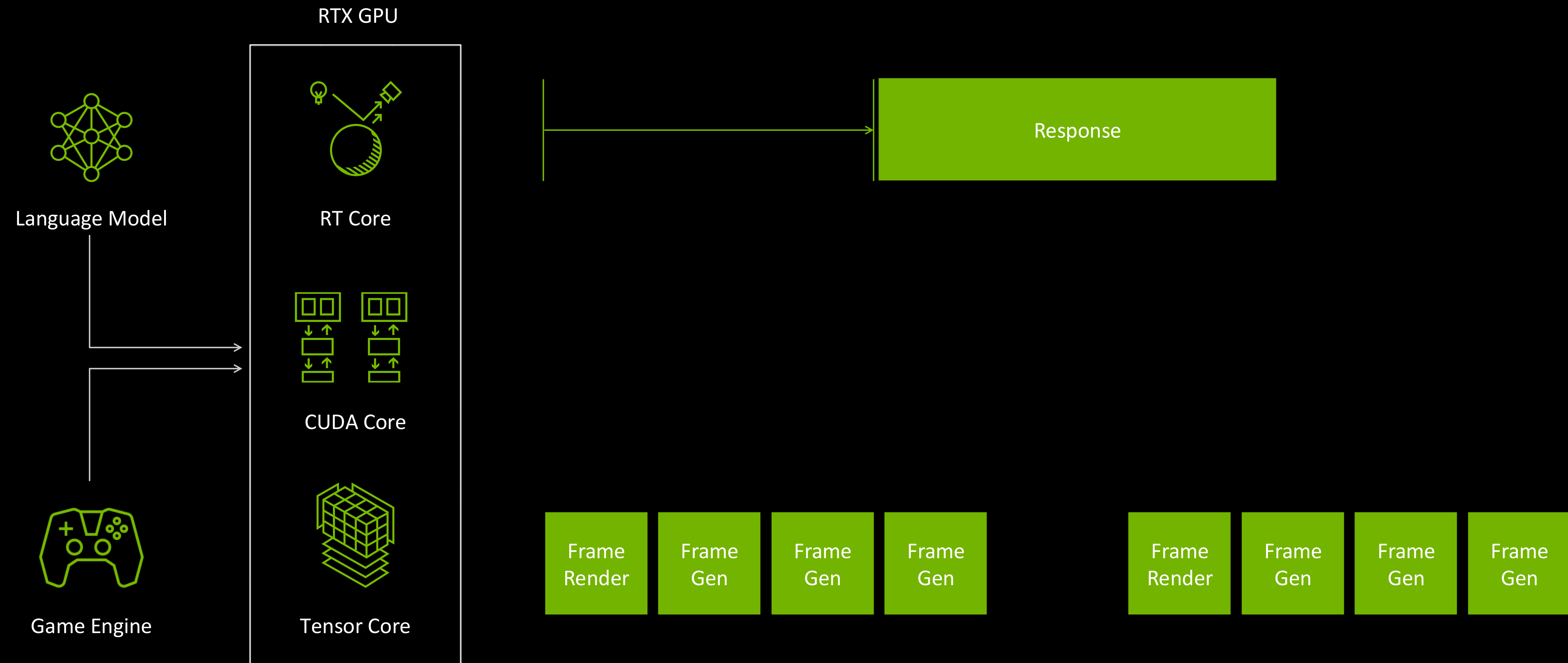


Ada Tensor Core
FP8

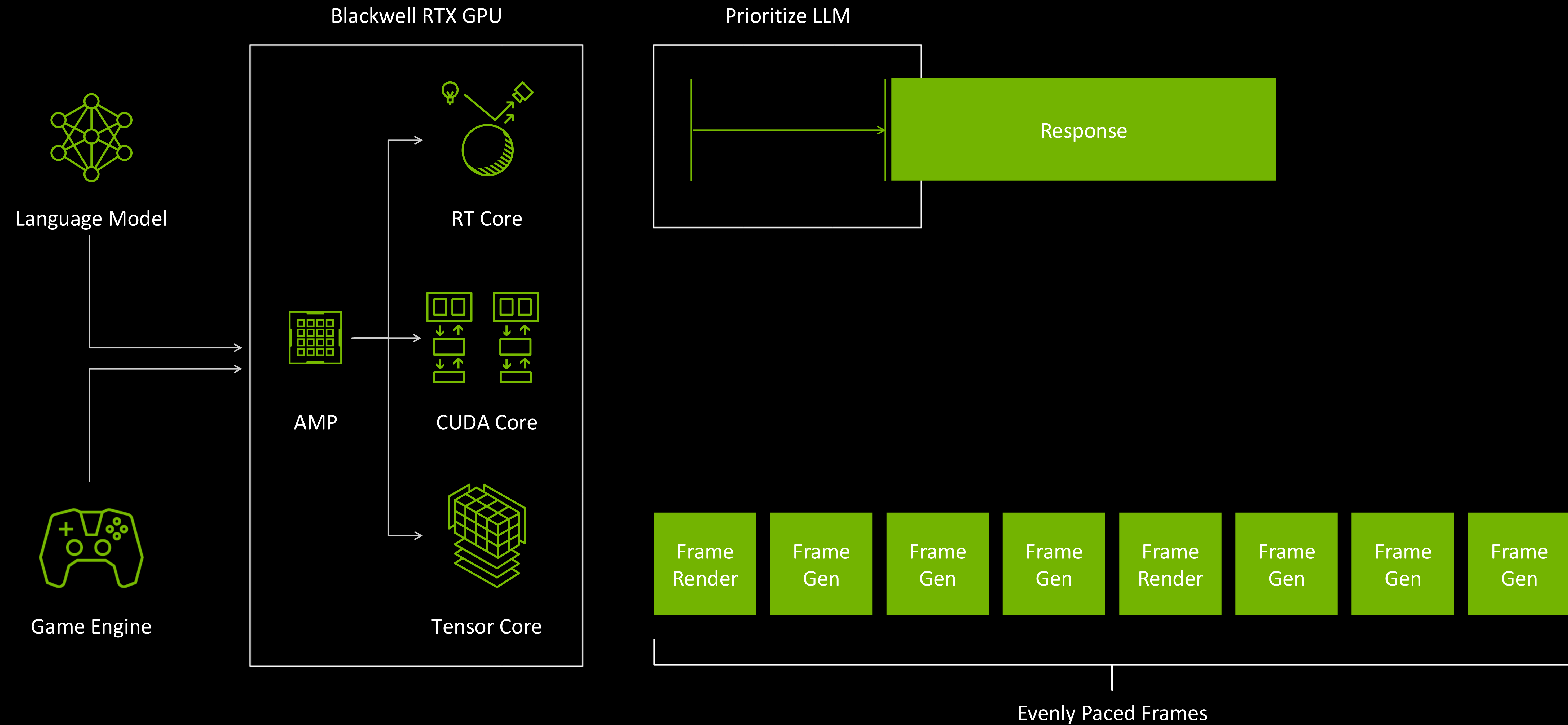


Blackwell Tensor Core
FP4

Simultaneous AI and Graphics Workloads



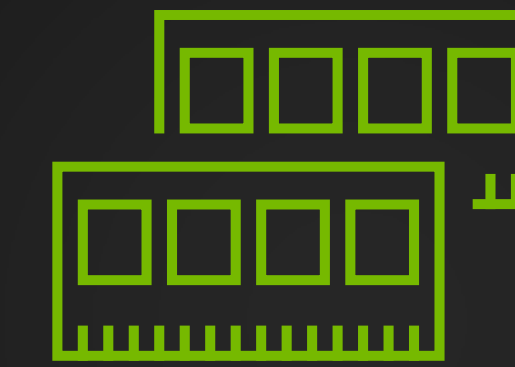
AI Management Processor



Blackwell is Designed for Max-Q



DLSS 4



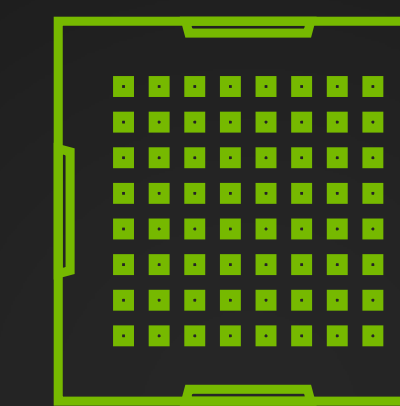
Voltage
Optimized GDDR7



Accelerated
Frequency Switching

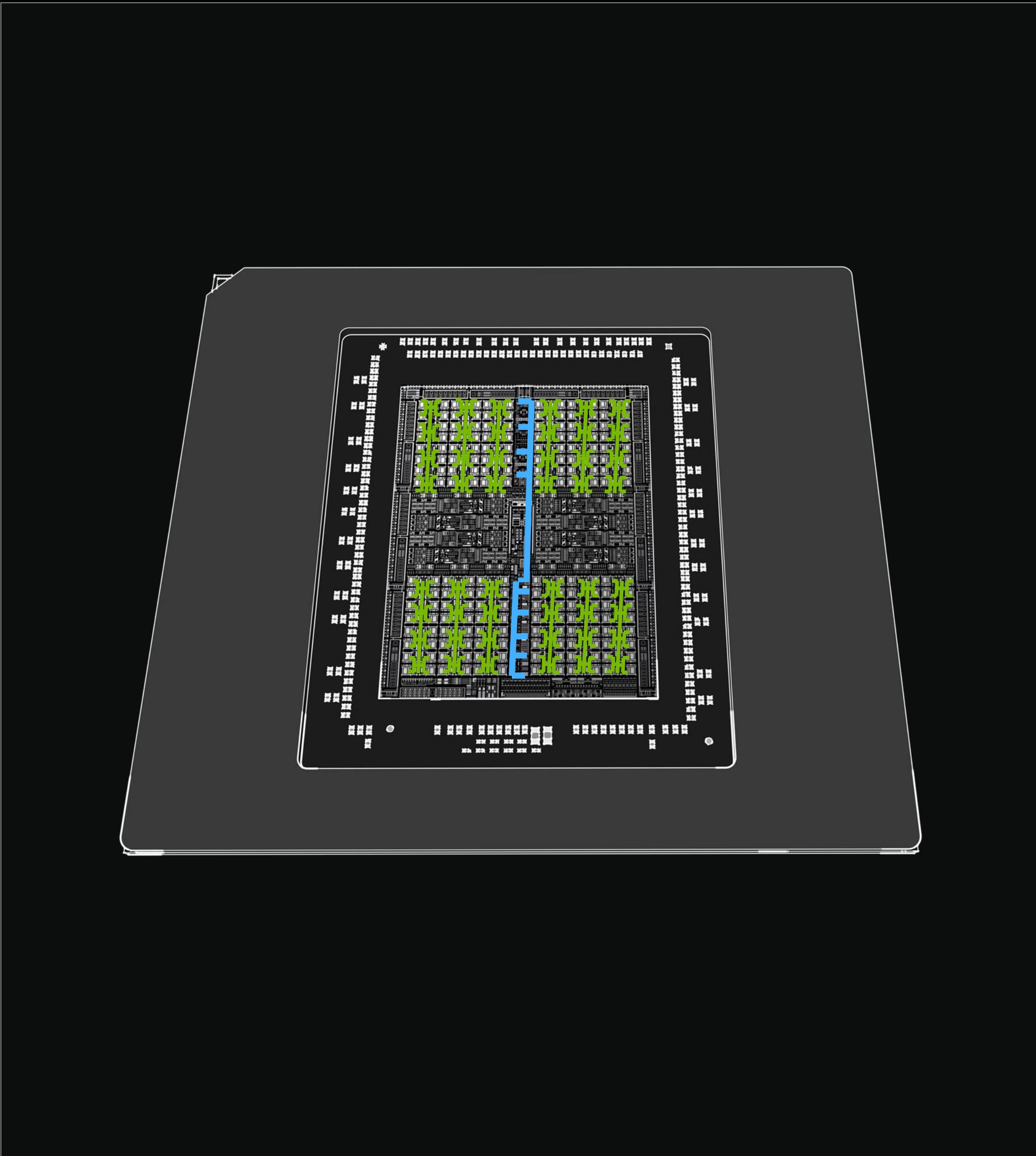


Low Latency
Sleep

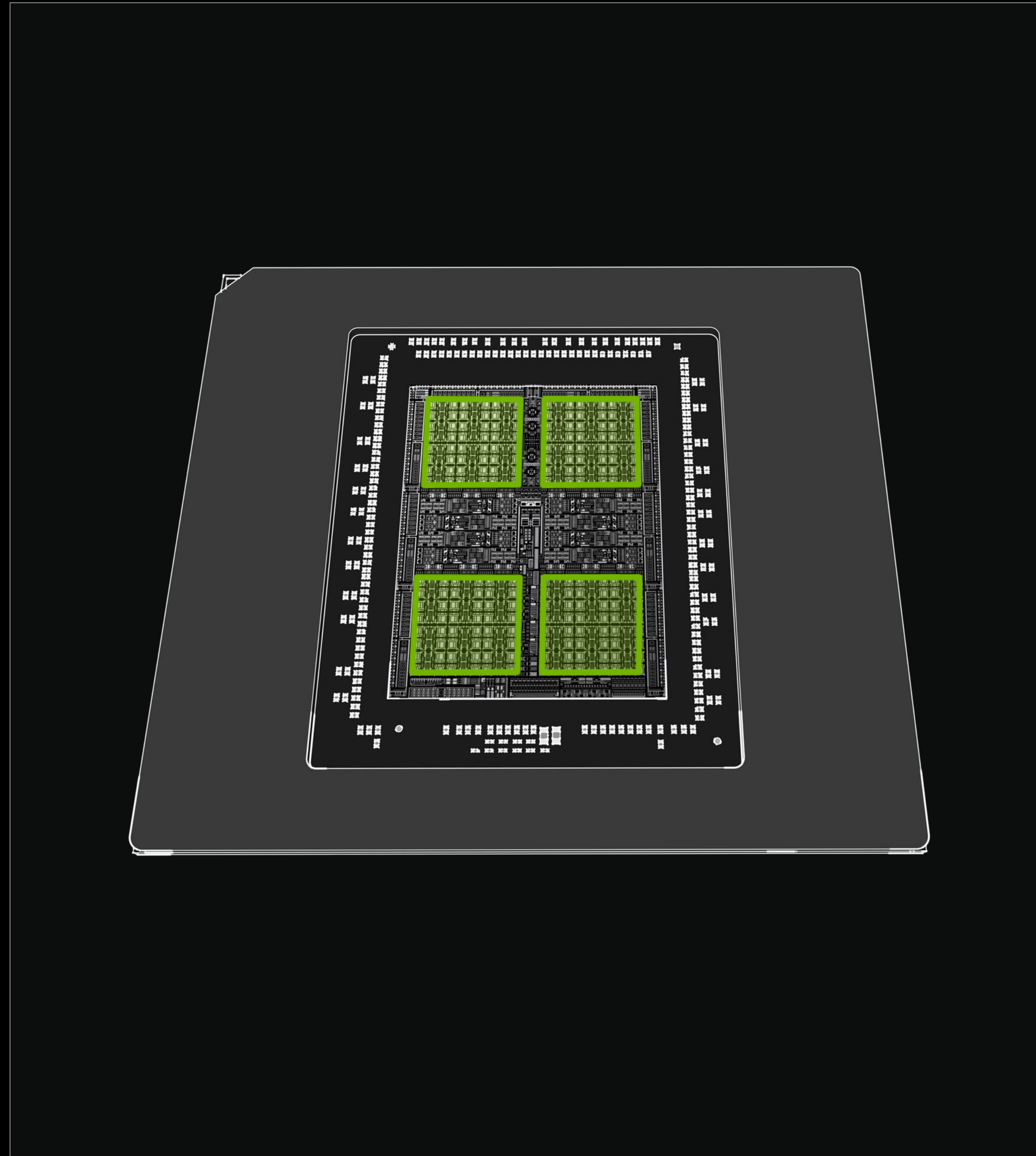


Advanced
Power Gating

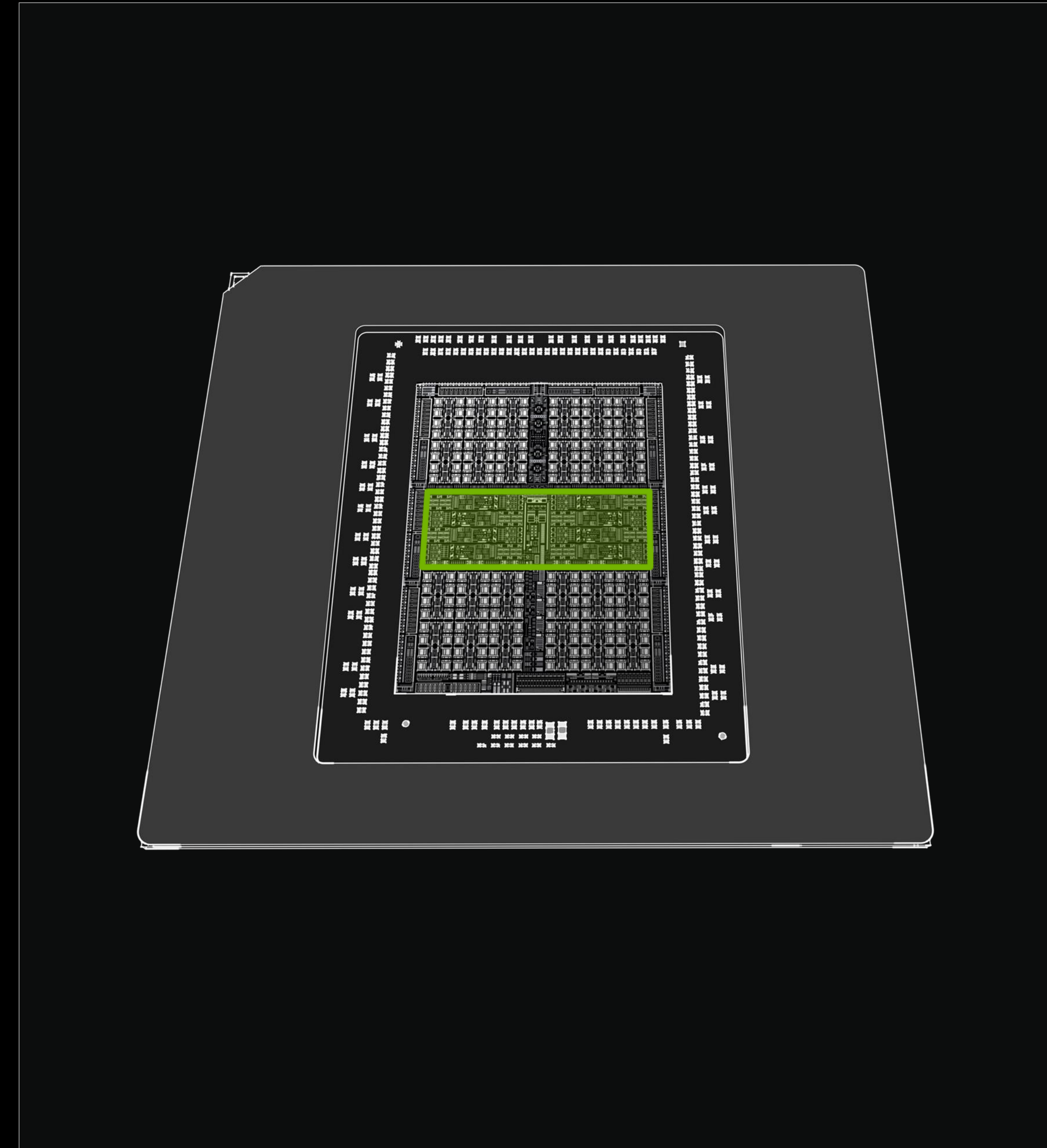
Advanced Power Gating



Clock Gating

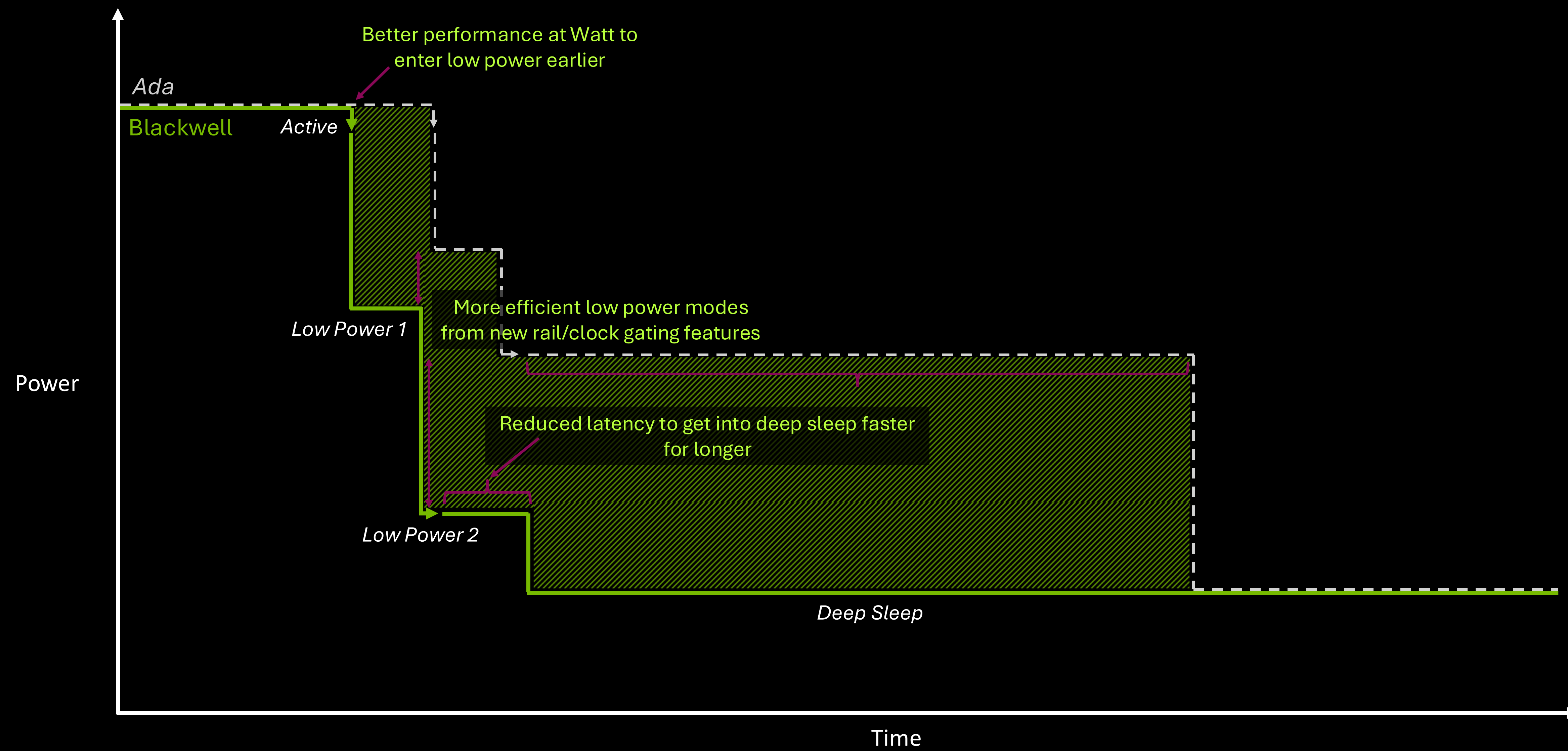


Power Gating



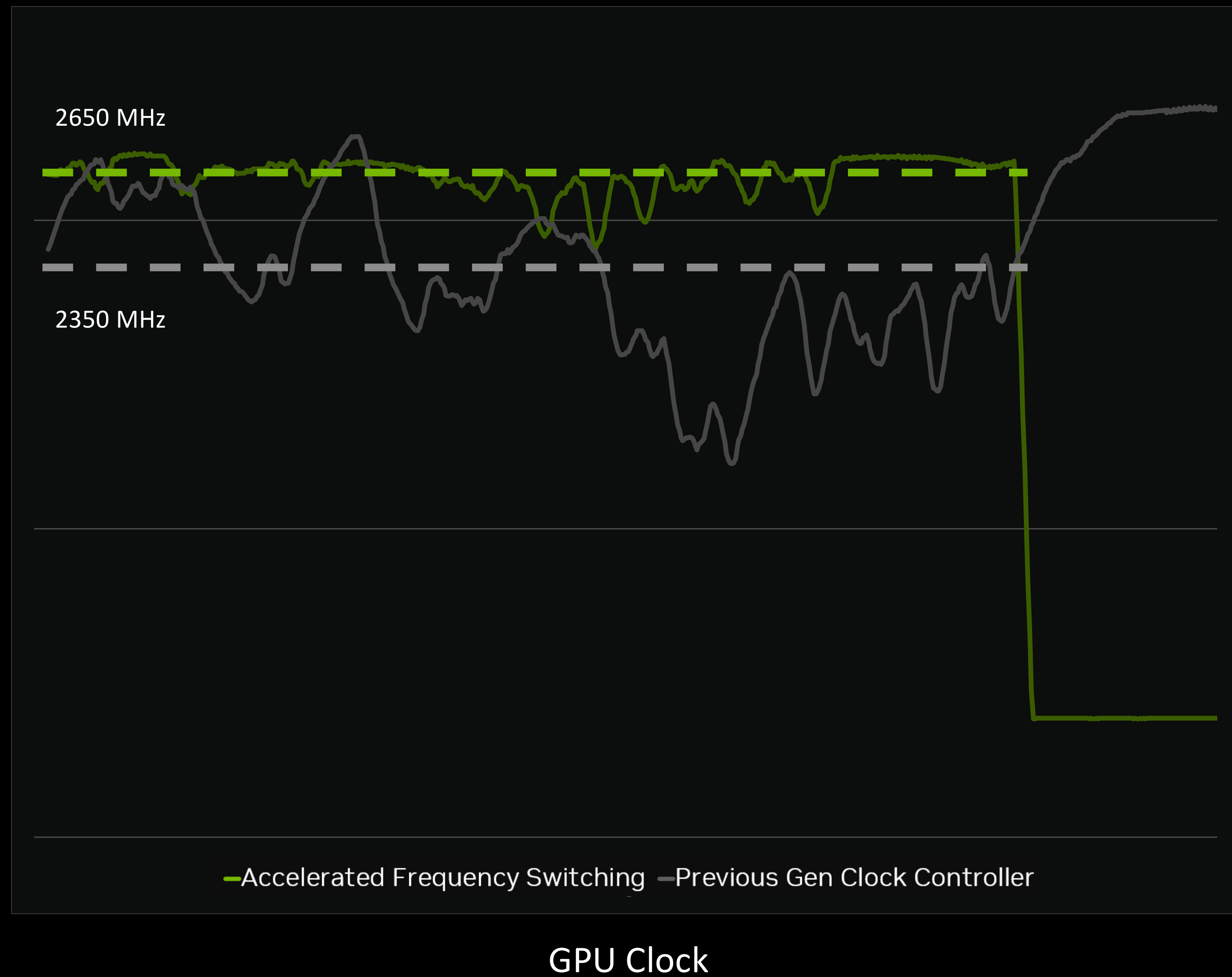
Rail Gating

Power Savings Advancements



50% Power Savings

Accelerated Frequency Switching



- 1000x Faster Clock Responsiveness
- Higher SM efficiency through rapid clock adjustments in dynamic workloads

Blackwell Display and Video

Ada Display Engine

DisplayPort 1.4a
HBR3
8.1 Gbps

Blackwell Display Engine

DisplayPort 2.1
UHBR20
20 Gbps

High Speed HW
Flip Metering

Ada

8th Generation Encoder
5th Generation Decoder

Blackwell

9th Generation Encoder
6th Generation Decoder

AV1

H.264 Decode

AV1
UHQ

2x
H.264 Decode

HEVC

4 2 0
Encode / Decode

MV-HEVC

4 2 2
Encode / Decode

Blackwell Optimized for Multi Frame Gen

Enhanced Tensor Core
Throughput

Enhanced
Flip Metering

AI-Management Processor