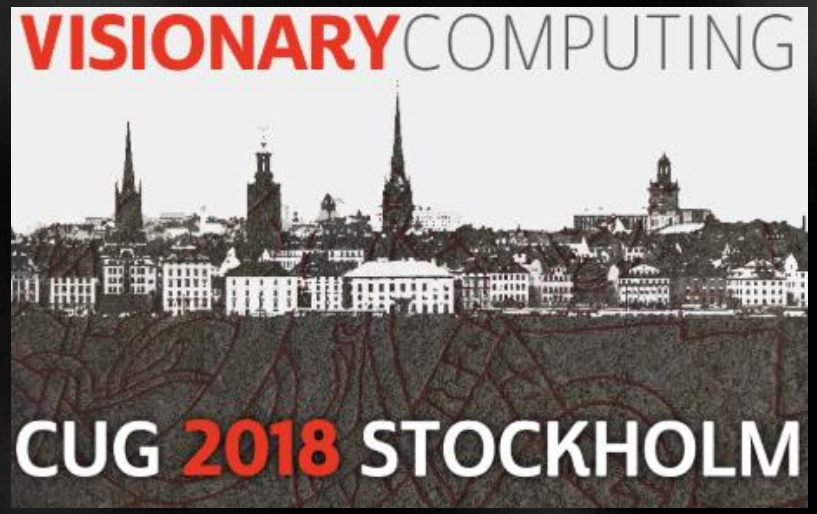


AMD

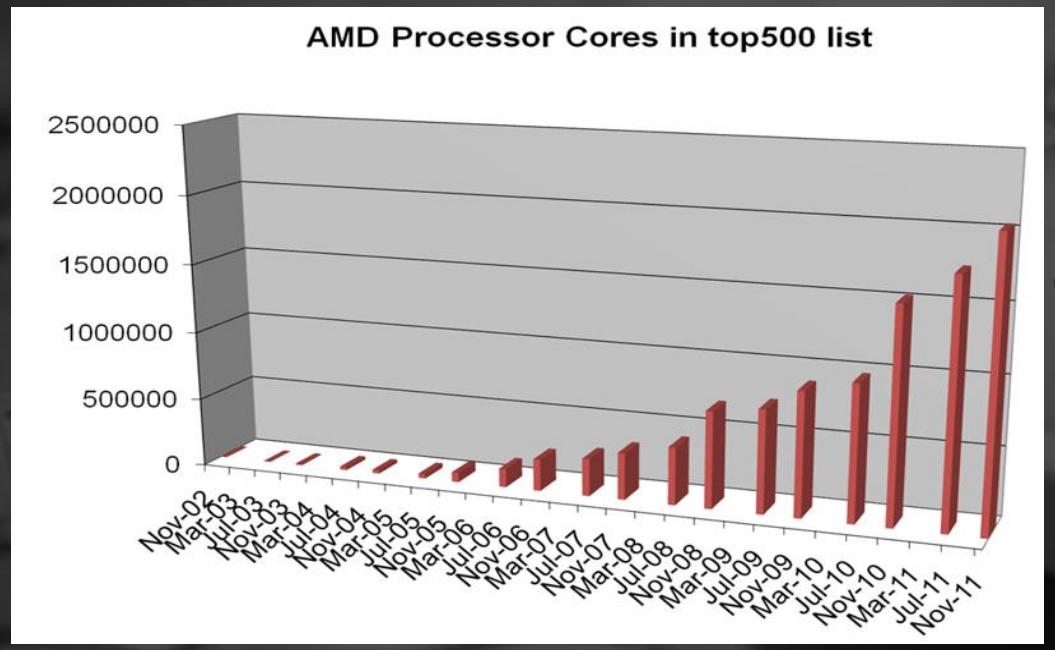
AMD UPDATE
CUG 2018

EPYC

CRAY
THE SUPERCOMPUTER COMPANY

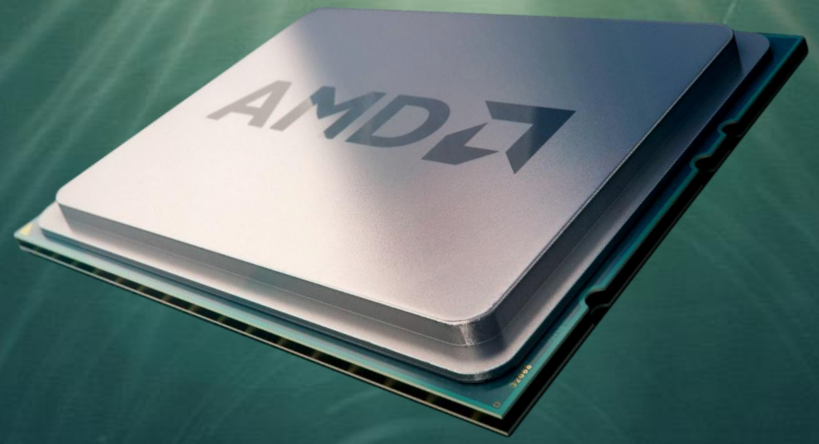
CRAY AND AMD PAST SUCCESS IN HPC

AMD IN TOP500 LIST 2002 TO 2011



2011 - AMD IN FASTEST MACHINES IN 11 COUNTRIES

Rank	Country	Site	Partner
3	United States of America	Oak Ridge	Cray
12	Germany	Universitaet Stuttgart	Cray
19	United Kingdom (Scotland)	Edinburgh	Cray
31	Korea (South)	KMA	Cray
34	Switzerland	CSCS	Cray
41	Canada	Sherbrooke	SGI
44	Sweden	KTH	Cray
50	Brazil	INPE	Cray
61	Taiwan	Taiwan HPC Center	Acer
78	Austria	Vienna Scientific Center	Megware
203	Finland	CSC	Cray



“ZEN” A FRESH APPROACH

Designed from the Ground up for Optimal Balance of Performance and Power

Totally new high-performance core design	New high-bandwidth, low latency cache system	Simultaneous multithreading (SMT) for high throughput	Energy-efficient FinFET design tuned for enterprise applications

8 ZEN CORES PER DIE

Compute

8 Zen x86 cores

4MB total L2 cache

16MB total L3 cache

Memory

2 channels ddr4 with ECC

2 DIMM per channel

up to 256GB per channel

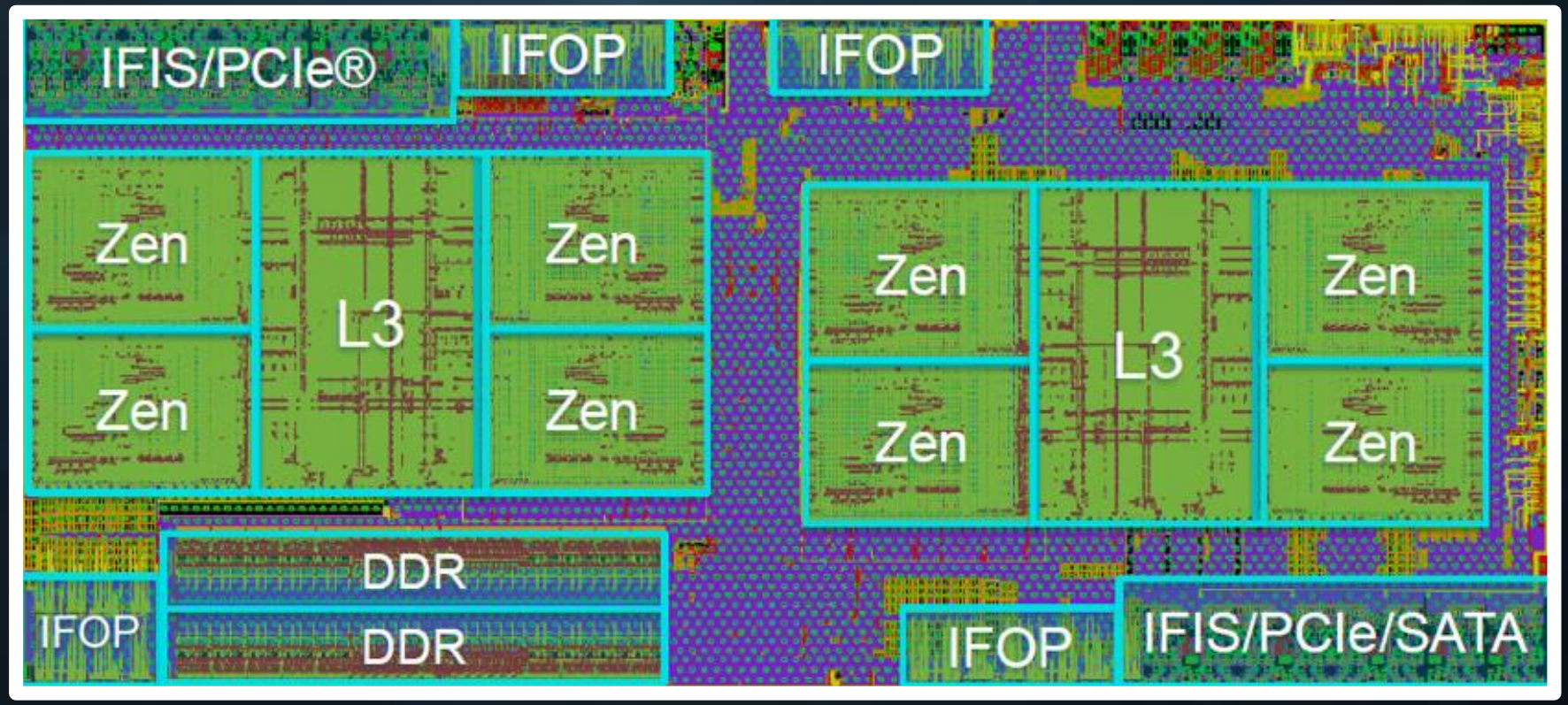
Infinity fabric

Connects die and I/O

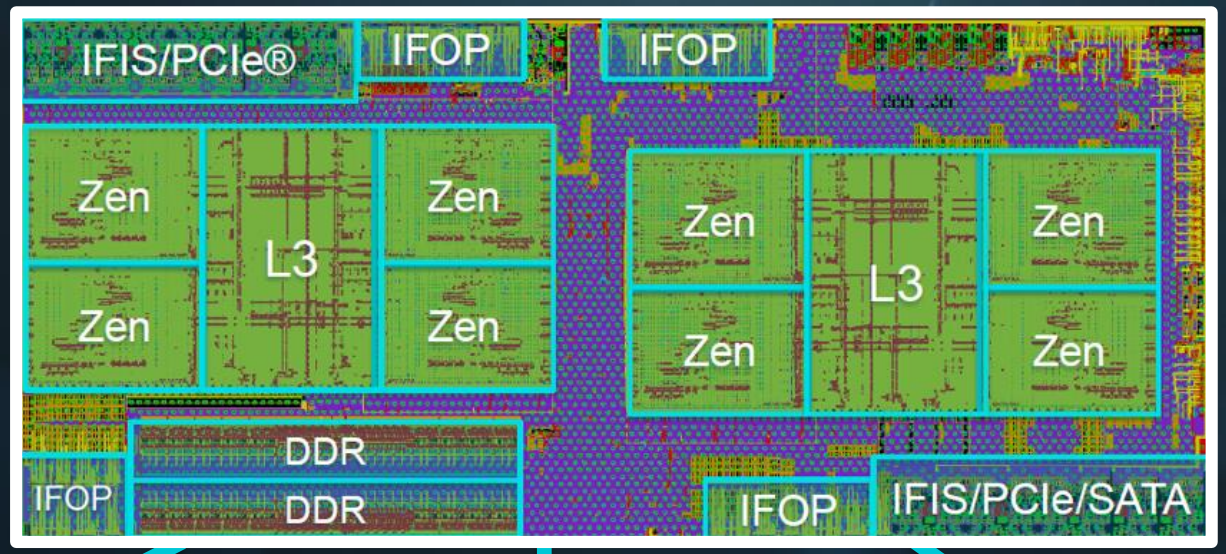
Security

On die security processor

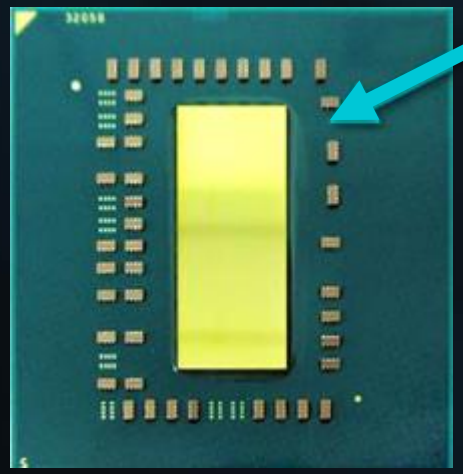
Memory encryption per VM

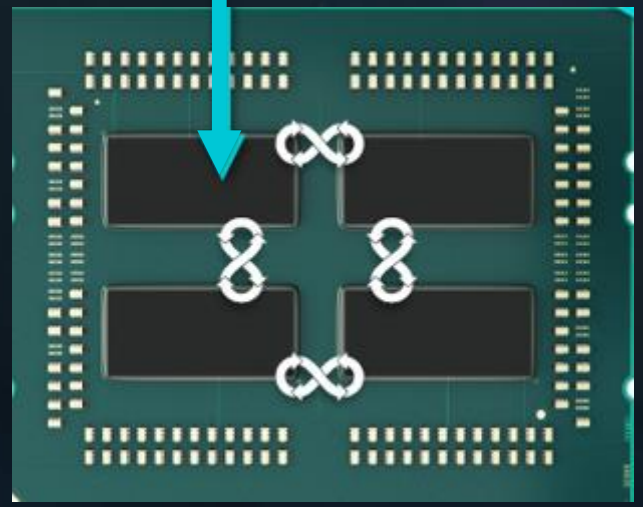


ZEN IN MULTI-CHIP ARCHITECTURES



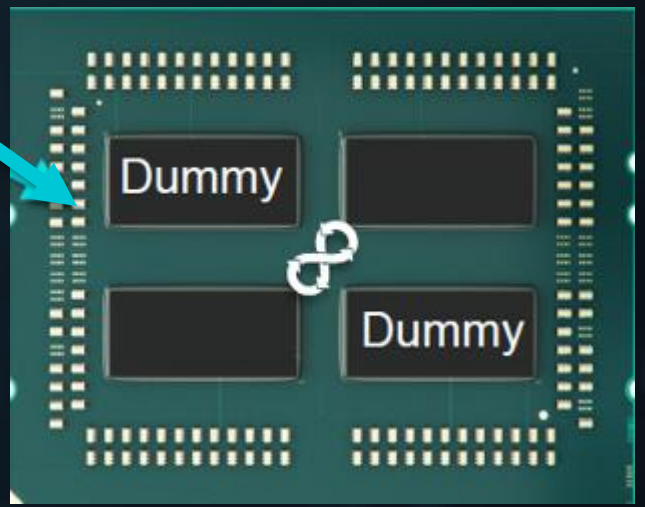
Ryzen 8c Desktop





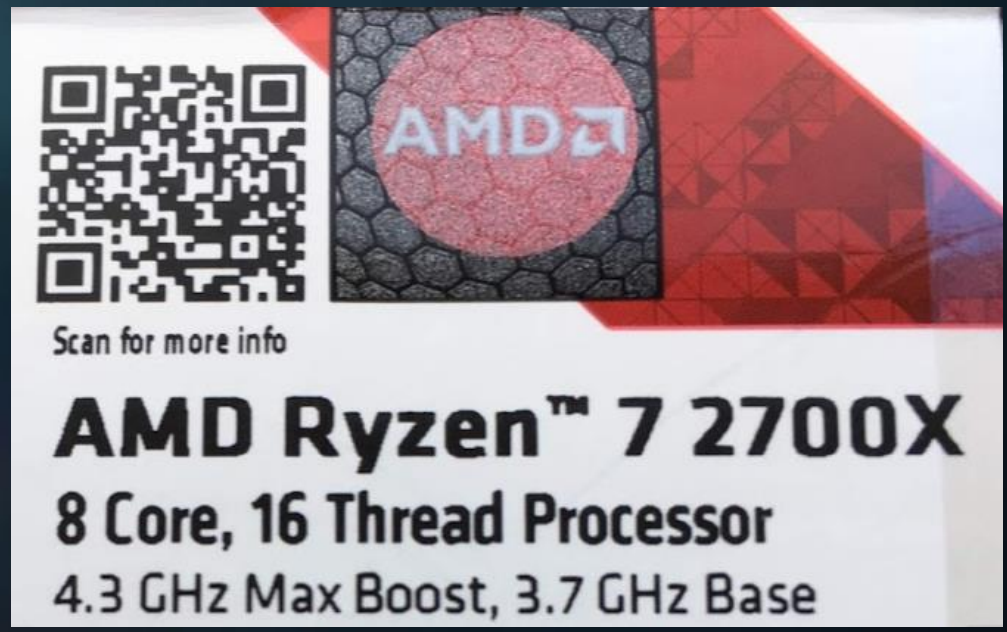
EPYC 32c HPC server

Threadripper
16c Workstation



POWER AND PERFORMANCE

RYZEN 2 – 12NM – IMPROVES TOP BOOST CLOCK



EPYC 7000 AT A GLANCE

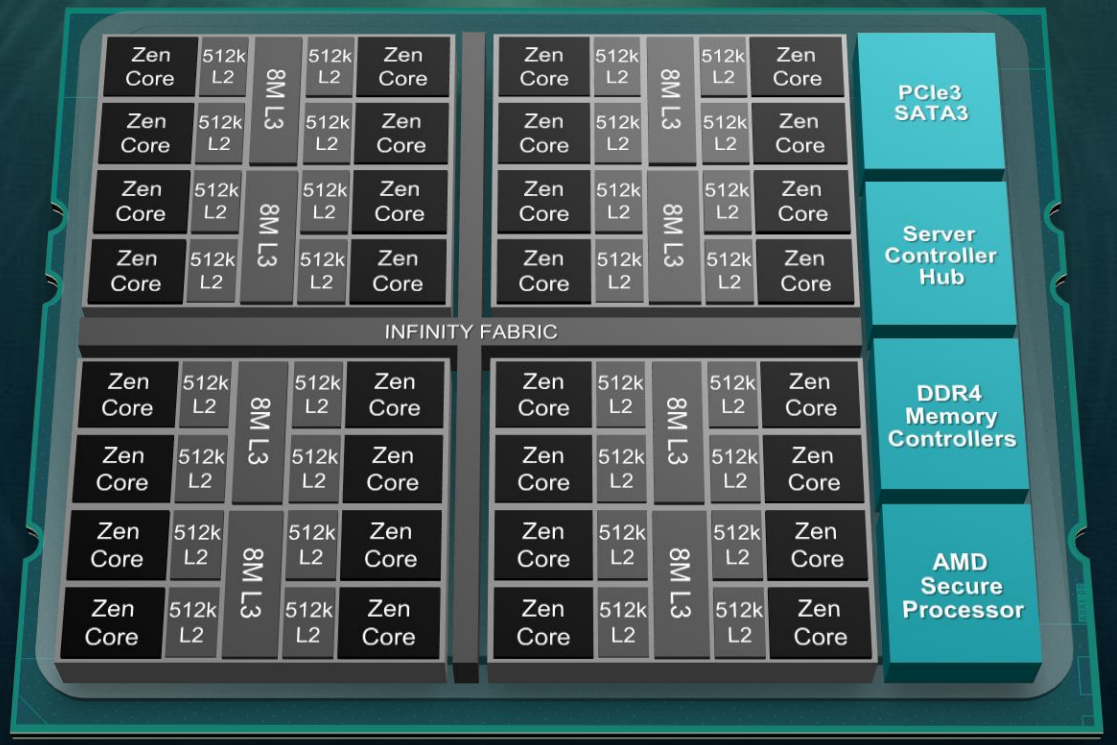
Lowering TCO through an Optimal Balance of Compute, Memory, I/O and Security

COMPUTE

- 8 to 32 AMD “Zen” x86 cores (16 to 64 threads)
- 512KB L2 cache per core (16 MB total L2 cache)
- 64MB shared L3 cache (8MB per 4 cores)
- TDP range: 120W-180W

MEMORY

- 8 channel DDR4 with ECC up to 2666 MHz
- RDIMM, LRDIMM, 3DS, NVDIMM
- 2 DIMMs/channel capacity of 2TB/socket



INTEGRATED I/O – NO CHIPSET

- 128 lanes PCIe Gen3
  - Used for PCIe, SATA, and Coherent Interconnect
  - Up to 32 SATA or NVMe devices
- Server Controller Hub (USB, UART, SPI, LPC, I2C, etc.)

SECURITY

- Dedicated Security Subsystem
- Hardware Root-of-Trust
- Hardware Memory Encryption

FEATURE CONSISTENCY AND SIMPLIFIED PRODUCT STACK

AMD

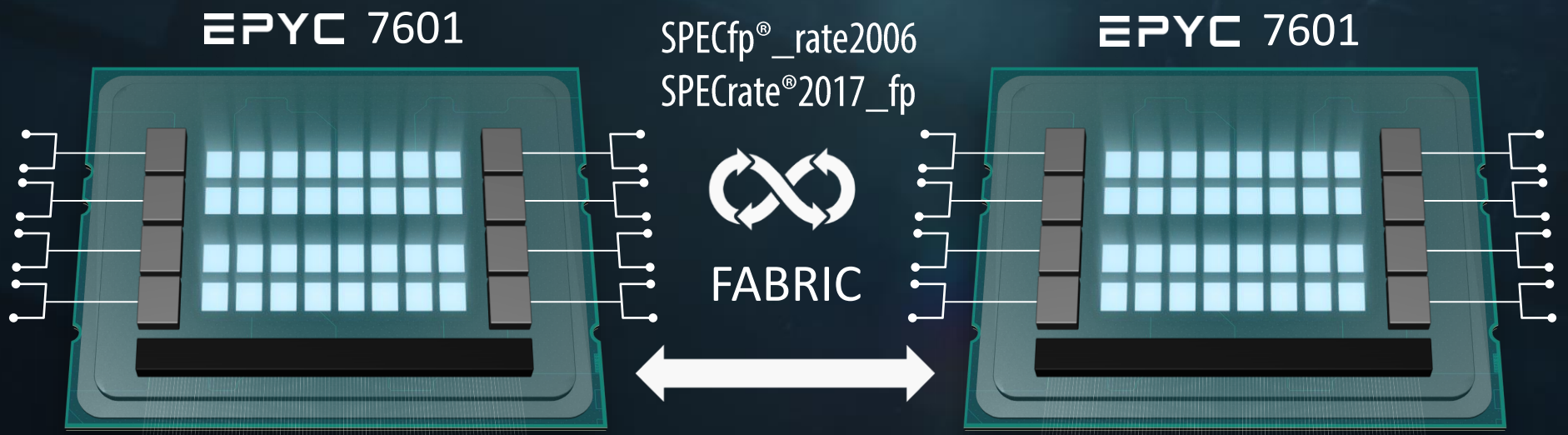
	EPYC 32 CORE		EPYC 24 CORE		EPYC 16 CORE		EPYC 8 CORE	
ONE-SOCKET AND TWO-SOCKET	7601	$4,200	7451	$2,400	7351	$1,100	7251	$475
	7551	$3,400	7401	$1,850	7301	$825		
	7501	$3,400			7281	$650		
ONE-SOCKET ONLY	7551P	$2,100	7401P	$1,075	7351P	$750		
DDR4-2666	✓		✓		✓		DDR4-2400	
2TB memory capacity	✓		✓		✓		✓	
128 lanes PCIe3®	✓		✓		✓		✓	
Turbo boost	✓		✓		✓		✓	
SMT	✓		✓		✓		✓	

AMD pricing based on 1k unit pricing January 2018

EPYC LEADERSHIP TWO-SOCKET

AMD

WORLD RECORD BENCHMARKS!



14% More Cores [1]

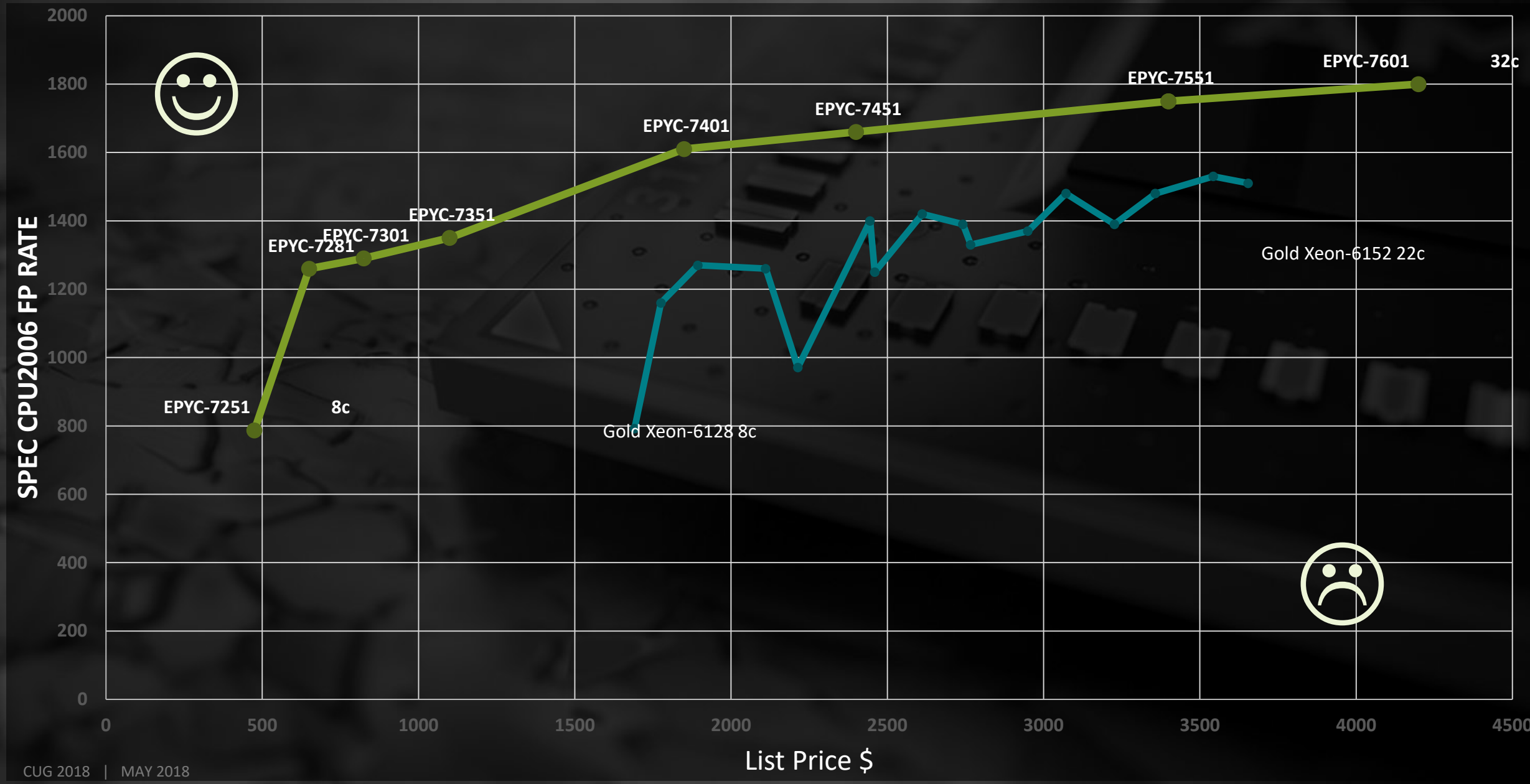
33% More Memory Bandwidth [2]

2.6x More Memory Capacity [3]

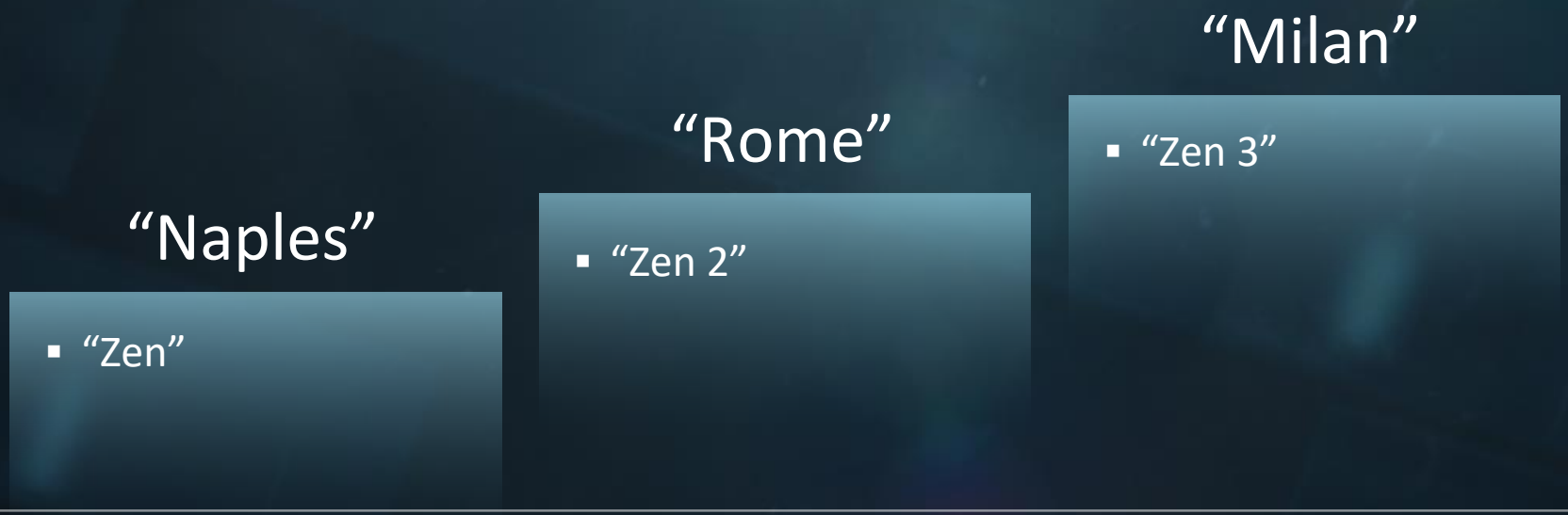
UP TO 2.6x More Performance / $ [4]

Feature and perf/$ comparison to 2 Intel Xeon Platinum 8180.
Perf/$ based on published prices and published SPECFP_rate2016 scores on spec.org
World record benchmarks based on SPECfp®_rate2006 and SPECrate®2017_fp scores on spec.org as of Jan. 18, 2018
See Endnotes

SPEC CPU2006 FP RATE BASE PERFORMANCE VS CPU $ PRICE



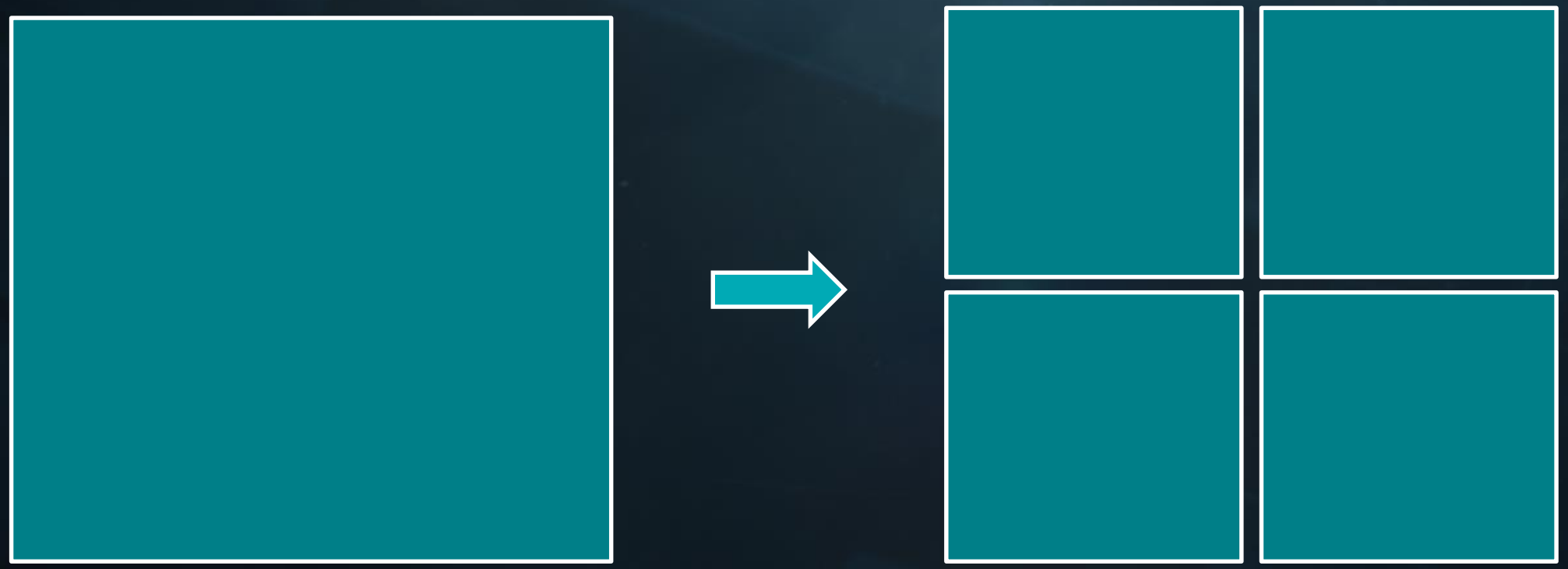
AMD X86 CORE ROADMAP

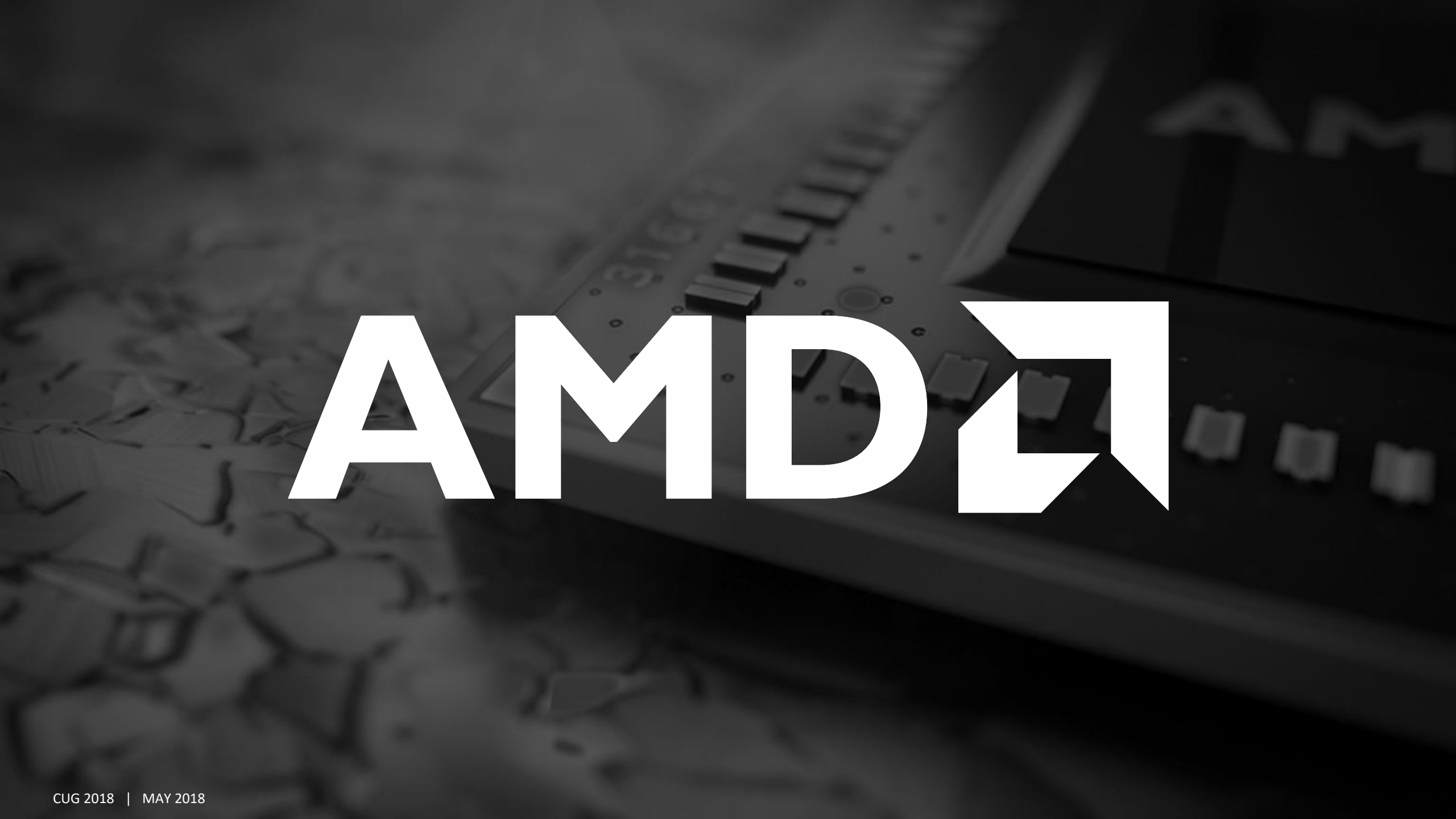


AMD IS BACK TO STAY

“NAPLES” TO “ROME” - WILL BE EPYC TOO

Artistic impression of 14nm to 7nm process shrink




AMD

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