

Tachyum Prodigy

The World's First Universal Processor

- Tachyum is developing the industry's first Universal Processor, AI, and supercomputing chip – Prodigy
- Prodigy has up to 21x higher AI performance and up to 10x better AI performance per watt than its competition
- Prodigy solves key issues plaguing today's data centers, including high power consumption, low server utilization, and the processor performance plateau that is limiting performance

Company and Product Overview

Tachyum is a semiconductor company developing the world's first Universal Processor, Prodigy, which unifies the functionality of CPU, GPGPU, and TPU into a single device, delivering unprecedented performance, power efficiency, and TCO reduction for a wide range of applications and workloads, including cloud, AI, and HPC.

Prodigy eliminates the need for costly and power-hungry accelerators, enabling high performance data centers to be deployed with a homogeneous architecture, enabling a simple software model, easy maintenance, and the ability to run servers 24/7 by running cloud workloads during peak hours and AI workloads during off hours.

In addition to running its native instruction set architecture, Prodigy runs the binaries for x86, Arm, and RISC-V, providing fast, easy, out-of-the-box testing and evaluation.

Tachyum has approximately 100 employees with engineering teams in Silicon Valley, Slovakia, Czech Republic, Taiwan, and the corporate office in Las Vegas, Nevada.



Target Markets and SKUs

The Prodigy family of processors encompasses multiple product SKUs ranging from 1024 to 32 cores with a wide range of performance, power, and features to address a wide array of important markets. Both the markets and SKUs are shown below, highlighting the Prodigy Series flexibility and ability to excel in a broad array of applications and workloads.



HPC, Big AI



Exascale Supercomputers



Cloud / Hyperscale



Edge / Telco



Big Data, Analytics, Databases, Storage



Crypto / Digital Currency

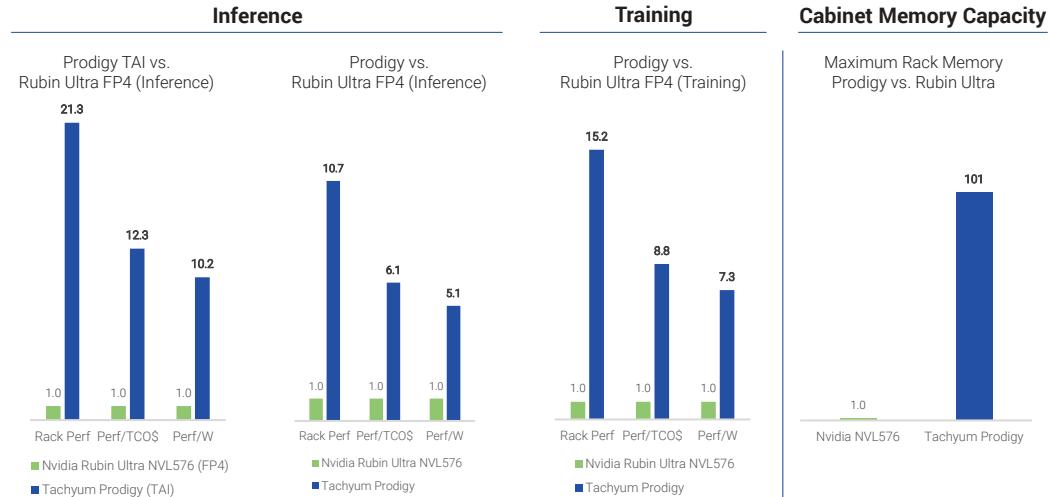
Prodigy SKU Summary

Product SKU	Number of Cores	Frequency (GHz)	Scalability	DDR5 Controllers	DDR5 Speed	PCIe 7.0 Lanes	TDP	Target Markets / Applications
T241024	1024	6.0	8S	24	17600	128	1600	Top-End HPC, Big AI
T24768	768	5.0	8S	24	17600	128	1000	Entry HPC, Big AI, Crypto, Digital Currency
T16512	512	6.0	16S	16	12800	128	800	Analytics, Big Data, Crypto, Digital Currency
T16448	448	5.5	16S	16	12800	128	645	Analytics, Big Data, In-Memory Databases
T16384	384	5.5	2S	16	12800	128	550	Cloud, Analytics, Big Data
T16320	320	5.0	2S	16	10700	128	420	Cloud, Edge/Telco
T16256	256	4.5	2S	16	10700	128	300	Cloud, Databases, Edge/Telco
T8256	256	4.5	1S	8	10700	96	300	Cloud, Databases, Edge/Telco
T8128	128	4.5	1S	8	9600	96	150	Cloud, Databases, Storage
T896	96	5.5	1S	8	9600	96	140	Cloud, Databases, Storage
T464	64	4.0	1S	4	6400	48	70	Entry Cloud, Storage
T432	32	3.5	1S	4	6400	24	30	Low Power, Hosting

Performance

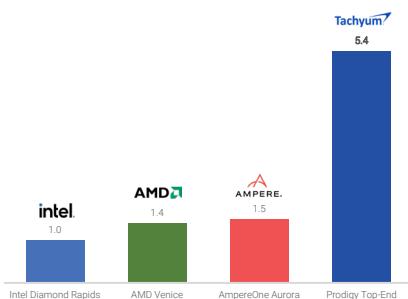
Prodigy vs. NVIDIA Rubin Ultra AI Rack Performance

Prodigy Racks Deliver up to **21x Higher AI Rack Performance**, up to **10x Better AI Performance/Watt**, and **100x More Memory** than Nvidia Rubin Ultra NVL576



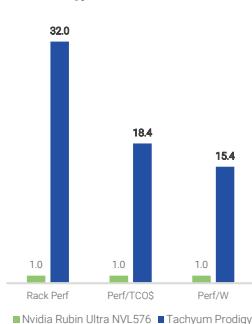
Cloud Performance vs. x86 and Arm

SPECrate 2017 Integer



HPC Rack Performance vs. Nvidia Rubin Ultra

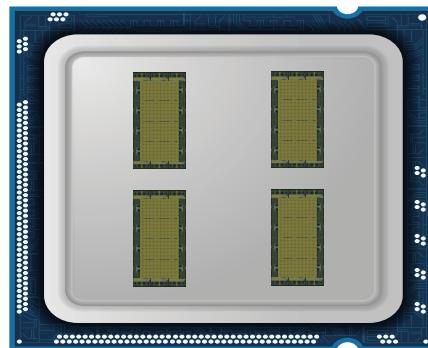
Prodigy vs. Rubin Ultra FP64



Prodigy Racks Easily Switch from **5x Higher Cloud Performance** than x86 to **32x Better HPC Performance** than Nvidia Rubin Ultra

Device Architecture

Prodigy's groundbreaking universal processor architecture includes 1024 high-performance CPU cores, 24 DDR5-17600 memory controllers, and 128 lanes of PCIe 7.0 delivering processing power and high memory and I/O bandwidth that is designed to be balanced, optimizing system performance and avoiding bottlenecks. Prodigy will be manufactured in 2nm process technology. Key features and corresponding benefits are highlighted below.



Prodigy Chiplet Architecture

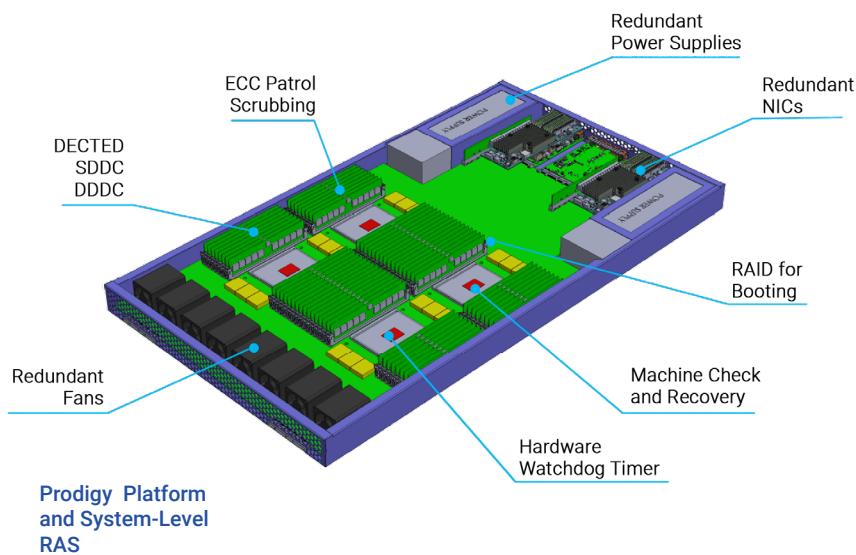
Key Features

Features

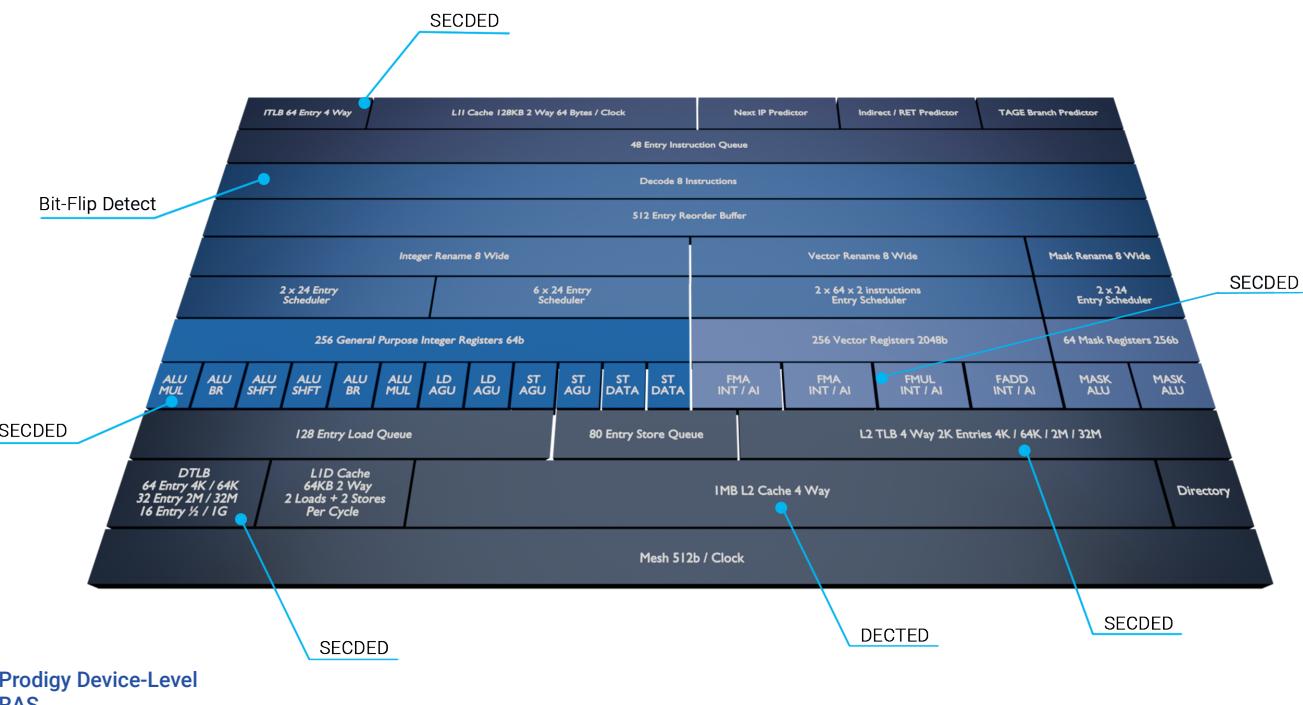
Benefits

1024 64-bit cores running at 6 GHz	Highest performance for compute workloads
HW coherency supports up to 16-socket systems	High scalability for powerful compute nodes
24 DDR5-17600 memory controllers	High memory capacity and bandwidth for LLMs
6.75 TB/s - 13.5 TB/s* of memory bandwidth	*Bandwidth amplification doubles bandwidth
128 lanes of PCIe 7.0 with 64 controllers	High performance NICs, large NVMe storage arrays
Runs native and x86, Arm, and RISC-V binaries	Fast, easy, out-of-the-box testing and evaluation
Advanced matrix and vector units	High-performance AI and HPC
FP64, FP32, TF32, BF16, Int8, FP8, TAI data types	Converged, homogeneous data centers
Sparsity	Maximum AI performance and memory efficiency

Reliability, Availability, and Serviceability



Prodigy's revolutionary new architecture employs state-of-the-art technology, which requires that the design be complemented by high reliability, availability, and serviceability, or RAS, to ensure that customer platforms are not only high performance but reliable and easy to service in the field. Prodigy's RAS strategy is very comprehensive, encompassing multiple facets at the silicon, platform, and system level to ensure Prodigy deployments provide high performance along with high reliability and availability at all levels. Prodigy's device RAS features are designed to detect and, if possible, seamlessly correct errors in the CPU's internal memory blocks and attached DDR modules caused by external events. Prodigy's RAS features are summarized in the associated diagrams.



In 2016, the National Institute of Standards and Technology (NIST) launched the post-quantum cryptography program (PQC) to address the threat with quantum computers and ensure that no QC can be used to break crypto codes. By 2022, four algorithms were selected and in 2023, three of the four had draft versions released and the fourth was expected by late 2024, so it should be released in 2025. In the information box there are the new PQC quantum-resistant algorithms that were selected in 2022.

Tachyum's world-class software engineering team has ported and verified all the new quantum-resistant asymmetric algorithms on Prodigy. The algorithms are running as part of Prodigy's standard software distribution for all customers and partners, and Tachyum continues to optimize them to ensure it has the fastest possible solution to deploy. Prodigy also supports the quantum-safe AES-256 which has already been optimized.

Post-Quantum Cryptography Support

Key Establishment

- FIPS 203: ML-KEM or CRYSTALS-Kyber



Digital Signature

- FIPS 204: ML-DSA or CRYSTALS-Dilithium
- FIPS 205: SLH-DSA or Sphincs+
- FIPS 206: Falcon

Prodigy's swift support for these vital new PQC algorithms underscores Tachyum's commitment to data security, ensuring that Prodigy-based systems will be future-proofed as new threats emerge.

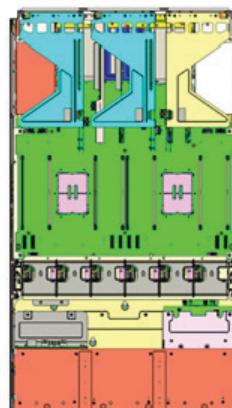
Platform Strategy

Prodigy's platform strategy includes two types of evaluation platforms. A standard, air-cooled 2-socket platform will be used for cloud and AI workloads, and for lead customers who require the highest performance, there is a liquid-cooled 4-socket platform that will be targeted for maximum AI and HPC performance. PCIe slots on both platforms support standard and OCP form factors.

The platforms support simple, out-of-the-box evaluation with an SDK that includes Linux, gcc compiler, software libraries, and a large ecosystem of recompiled native applications, streamlining software development.

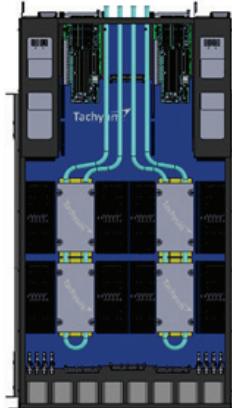
The evaluation platforms provide early customer access, and enable ODM/OEM partners to leverage the platforms to develop production designs and platforms.

Standard Platform for Cloud/AI



Air-Cooled 2-Socket Evaluation Platform

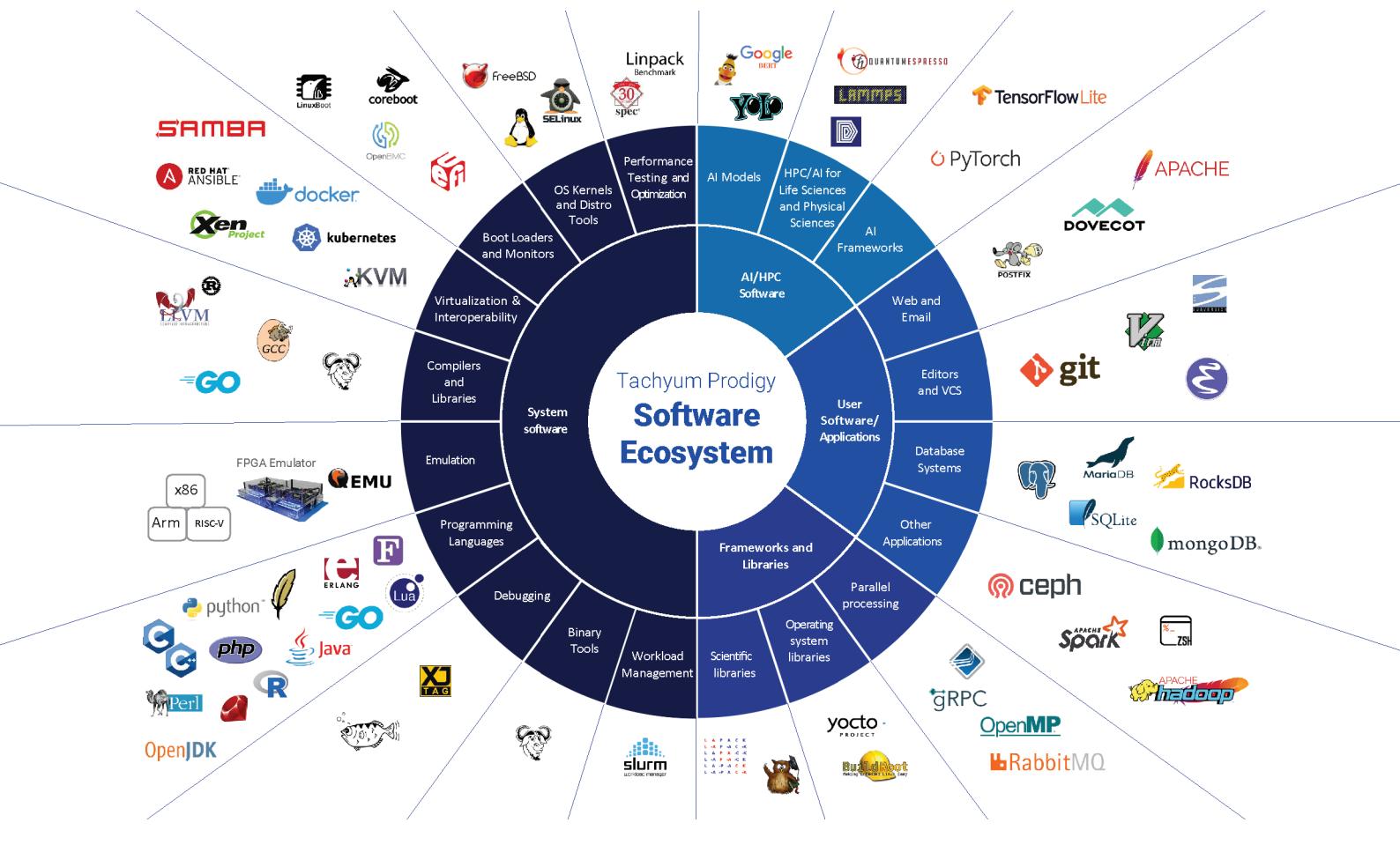
Lead Customer Platform for Maximum AI/HPC Performance



Liquid-Cooled 4-Socket Evaluation Platform

Prodigy Software Ecosystem

Prodigy has a rich ecosystem of development tools, operating systems, application software, and software libraries to enable fast, easy development and quick time to market.



Complete Software Ecosystem at www.tachyum.com/sw



www.tachyum.com



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