

Evolving Digital Horizons: The Intersection of AI, Cloud Computing, and Cybersecurity (2018-2023)



ABSTRACT

In the past five years, the digital world has experienced groundbreaking shifts in computer technology, reshaping the way we interact with digital environments. This study delves into the pivotal developments in computer hardware and software from 2018 to 2023, spotlighting the advancements in microprocessor technologies, the seamless integration of artificial intelligence (AI) and machine learning (ML), the rising dominance of cloud computing, and the evolving landscape of cybersecurity. Employing a comprehensive analysis approach, we investigate these areas to understand their collective impact on technology's evolution. Our findings reveal how these technological advancements have significantly enhanced computational efficiency, security, and accessibility, marking a new era in digital innovation. This research not only charts the trajectory of computer technology's evolution but also highlights the continuous interaction between emerging needs and technological advancements, offering valuable insights into future trends and directions in the digital realm.

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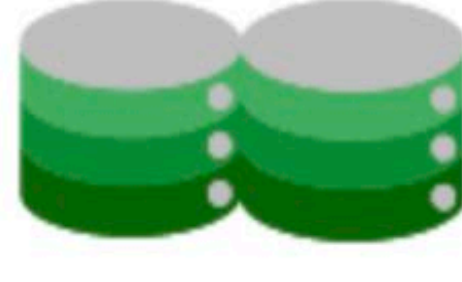


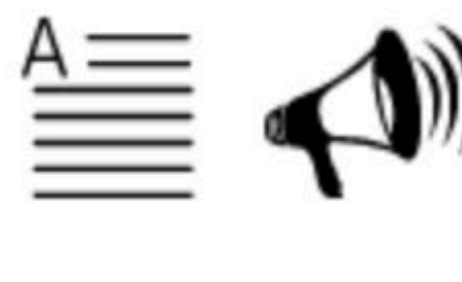








Model	Size	Memory capacity	Accuracy	Input formats
GPT-3	 175B	 1,500 words	 <60%	 Text, speech
GPT-3.5	 20B	 8,000 words	 <60%	 Text, speech
GPT-4 <small>greenice</small>	 >1T (?)	 25,000-64,000 words	 >80%	 Text, speech, image

Fig. 2 – Comparison of the latest GPT models and their major technological advances.

AI Virtual Assistants

- ChatGPT – a friendly, multi-purpose AI tool used to interact easily with users of different backgrounds
- Major technological advances in capabilities between GPT-3 and GPT-4 (Fig. 2)
- Successful use in Healthcare, Education, Customer Service, and more
- Continuous improvement everyday through various internal system updates

Reference: <https://www.forbes.com/sites/bernardmarr/2023/05/19/a-short-history-of-chatgpt-how-we-got-to-where-we-are-today/?sh=63dcb032674f>



Figure 3 shows the top ten threats for Cybersecurity.

Cloud Computing

- Cloud Computing delivers services over the internet for a better, faster access to resources with minimal effort.
 - Infrastructure as a Service (IaaS), Platform as a Service (PaaS), and Software as a Service (SaaS)
 - Benefits: Cost-effectiveness; pay only for what you use; increased speed and agility
 - Developments: increased adoption, improving security and compliance features.
 - Hybrid and multi-cloud strategies, edge computing.
- References: <https://www.ibm.com/topics/cloud-computing>
<https://www.forbes.com/advisor/business/what-is-cloud-computing/>

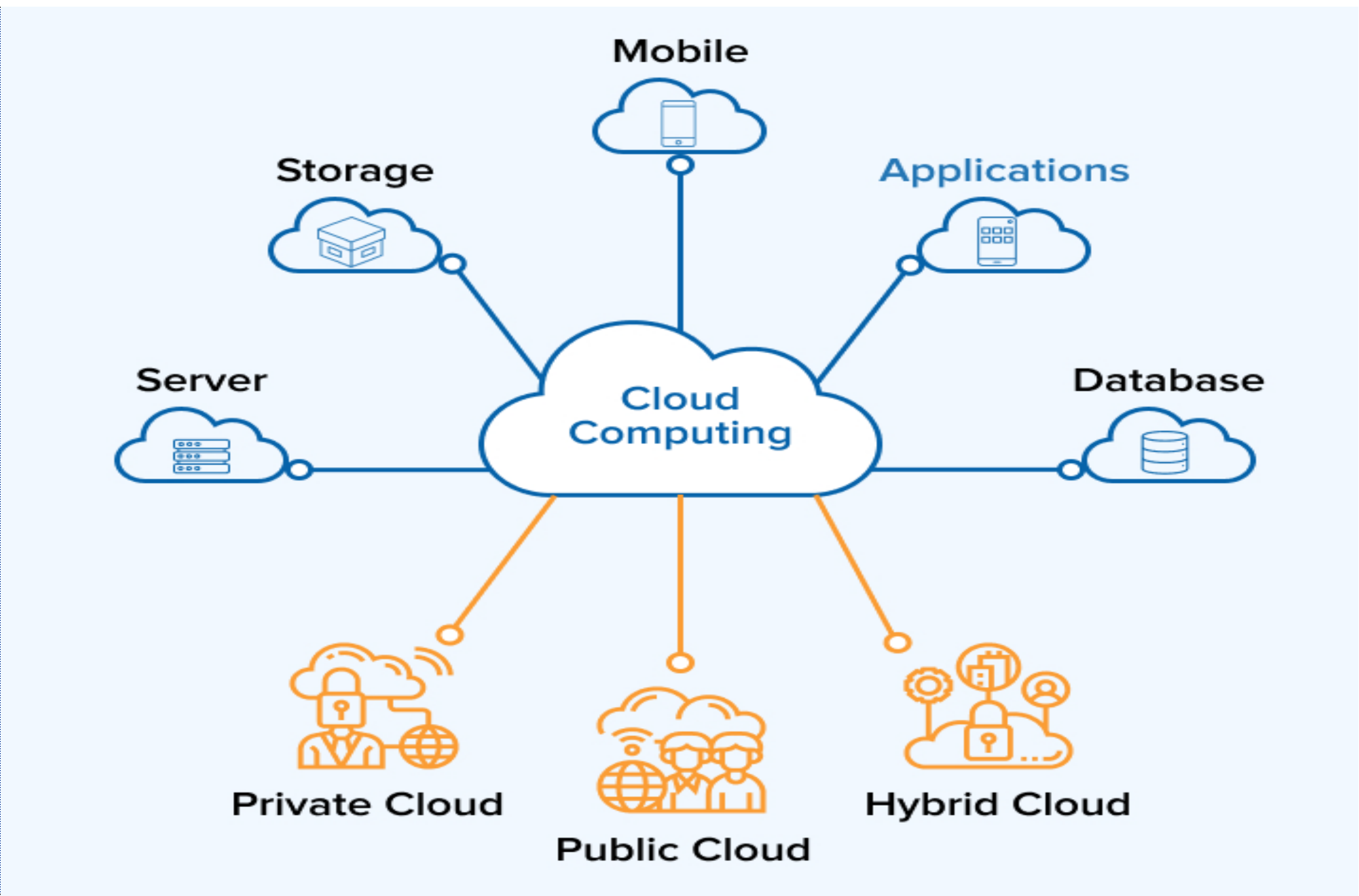


Figure 4. Cloud Computing and its application

Cybersecurity

- Artificial intelligence is increasingly vital in cybersecurity, addressing challenges like data breaches and cyberattacks while emphasizing AI's role in threat detection, incident response, and proactive defense strategies for businesses.
- The increasing adoption of Zero Trust Architecture (ZTA) highlights the importance of robust access restrictions and continuous authentication processes to enhance the security of networks, data, and applications.
 - Evolved to focus more on cloud security measures, including data encryption, identity management, and secure cloud configurations.
 - Endpoint security has expanded beyond traditional antivirus software to include advanced endpoint detection and response (EDR) solutions, aiming to protect devices and endpoints from sophisticated cyber threats.
 - Growing emphasis on human-centric security practices, such as security awareness training, phishing simulations, and behavioral analytics, to mitigate insider threats and improve overall cybersecurity posture.
- <https://aibusiness.com/verticals/ai-in-cybersecurity-understanding-the-digital-security-landscape>

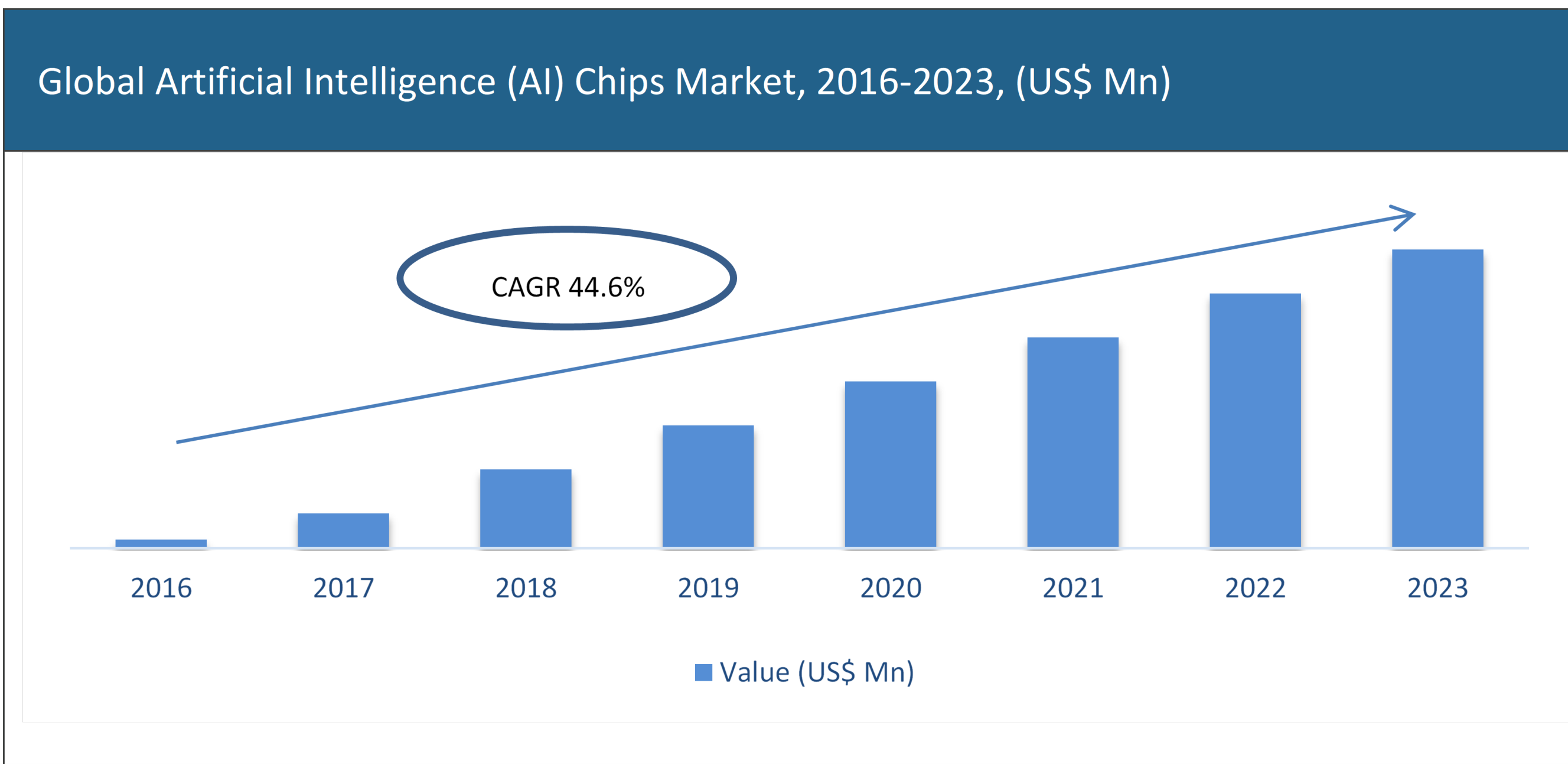


Figure 1. Shows the Compound annual growth rate of AI chips in the past 7 years.