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CS499

6-1 Journal: Emerging Technology and Artifact Update

**Part One:**

**What is the identification and description of each technology?**

*Technology 1: Cloud Computing*

Cloud computing represents a paradigm shift in how data storage and processing are handled. Instead of relying on local servers or personal devices, cloud computing uses distributed networks of servers hosted on the internet to store, manage, and process data. This model enables ubiquitous, convenient, on-demand network access to a shared pool of configurable computing resources that can be rapidly provisioned and released with minimal management effort or service provider interaction (Mell & Grance, 2011). Service providers like Amazon Web Services (AWS), Microsoft Azure, and Google Cloud have broadened access to high-performance computing resources, enabling businesses and individual consumers to scale their operations with minimal upfront costs (Deloitte Insights, 2019).

*Technology 2: Blockchain Technology*  
Blockchain is a decentralized, distributed ledger system that enables secure, transparent, and tamper-proof transactions. While most broadly known for underpinning cryptocurrencies like Bitcoin, blockchain has evolved to support various applications, including supply chain management, voting systems, and digital identity verification. Its key features of immutability, decentralization, and transparency have made it an emerging choice in industries that can benefit by moving away from a centralized transaction model.

**What are the likely impacts on computer science or your career?**

Cloud Computing will continue to reshape how software is developed, deployed, and maintained. It has introduced new subfields in computer science, such as cloud architecture, DevOps, and serverless computing (Mell & Grance, 2011). For my career, my organization is currently transitioning from an on-premises data processing and storage solution to a cloud-based platform, so this technology is immediately relevant to me. Successfully leveraging the advantages offered by cloud-based data storage and processing while simultaneously mitigating the drawbacks and ongoing costs associated with it will be critical to my professional success in the immediate future.

Blockchain technology has brought new challenges and opportunities to computer science, particularly in cryptography, distributed systems, and database management (Iansiti & Lakhani, 2017). For my career, blockchain expertise could open pathways in fintech, cybersecurity, and decentralized application development. Additionally, the demand for blockchain developers is growing, offering opportunities to work on cutting-edge applications that redefine trust and collaboration in digital systems.

**How might the two technologies impact humans, communities, or the world?**

Cloud computing has reduced the barrier to entry for individuals and startups who require advanced computing resources. This can increase the opportunity for new businesses to launch or grow. For communities, cloud computing facilitates remote work, education, and telemedicine, breaking down barriers to access. However, it also raises concerns about data privacy, security, and the environmental impact of data centers.

Blockchain technology creates a mechanism to establish transparency and trust in systems that previously might have previously been reliant intermediaries (Iansiti & Lakhani, 2017). For humans and communities, it offers a way to secure transactions, establish digital identities, and enable decentralized decision-making. Blockchain has been used to improve financial inclusion by providing banking services to unbanked populations and ensuring the traceability of aid in disaster relief efforts (Keller, 2023). However, it also faces criticism for high energy consumption (in proof-of-work systems) and scalability challenges (Mearian, 2019).

**Which course outcomes have you achieved so far, and which ones remain?**

At this point, I have achieved all of the course outcomes. However, I will continue to strengthen my demonstration of following course outcome by completing my professional self-assessment and finalized ePortfolio:

Design, develop, and deliver professional-quality oral, written, and visual communications that are coherent, technically sound, and appropriately adapted to specific audiences and contexts

For reference, the other course outcomes which I have achieved are included below:

Employ strategies for building collaborative environments that enable diverse audiences to support organizational decision making in the field of computer science

Design and evaluate computing solutions that solve a given problem using algorithmic principles and computer science practices and standards appropriate to its solution, while managing the trade-offs involved in design choices

Demonstrate an ability to use well-founded and innovative techniques, skills, and tools in computing practices for the purpose of implementing computer solutions that deliver value and accomplish industry- specific goals

Develop a security mindset that anticipates adversarial exploits in software architecture and designs to expose potential vulnerabilities, mitigate design flaws, and ensure privacy and enhanced security of data and resources

**Part Two:**

* Software design and engineering
  + I have implemented enhancements for this artifact. Additional updates based on feedback have been completed.
* Algorithms and data structures
  + I have implemented enhancements for this artifact. Additional updates based on feedback have been completed.
* Databases
  + I have implemented enhancements for this artifact. Additional updates based on feedback are ongoing.

Based on the following table, I will identify my progress for each artifact with a numeric value.

|  |  |
| --- | --- |
| **1** | **Artifact Selected** |
| **2** | **Working on Initial Enhancements** |
| **3** | **Submitted; Awaiting Instructor Feedback** |
| **4** | **Working on Final Enhancements** |
| **6** | **Uploaded to ePortfolio** |
| **7** | **Finalized ePortfolio Entry** |

**Status Checkpoints for All Categories**

|  |  |  |  |
| --- | --- | --- | --- |
| **Checkpoint** | **Software Design and Engineering** | **Algorithms and Data Structures** | **Databases** |
| **Artifact Progress Numeric** | 4 | 4 | 3 |
| **Name of Artifact Used** | CS360 Android Inventory Management Application | CS300 Course Catalog Management Application | CS340 Animal Shelter Dashboard |
| **Status of Initial Enhancement** | Complete | Complete | Completed |
| **Submission Status** | Submitted | Submitted | Submitted |
| **Status of Final Enhancement** | Completed | Completed | In progress |
| **Uploaded to ePortfolio** | No | No | No |
| **Status of Finalized ePortfolio** | Not started | Not started | Not started |

**References**

Deloitte Insights. (2019). *Cloud computing: Transforming how businesses operate and deliver value.* Retrieved December 5, 2024, from [https://www2.deloitte.com/us/en/pages/technology/solutions/cloud-business-transformation.html](https://www2.deloitte.com/us/en/pages/technology/solutions/cloud-business-transformation.html\)

Iansiti, M., & Lakhani, K. R. (2017, January). The truth about blockchain. *Harvard Business Review.* Retrieved December 5, 2024, from <https://hbr.org/2017/01/the-truth-about-blockchain>

Keller, M. (2023, May 31), *How blockchain is transforming disaster relief*. Algorand Blog. Retrieved December 5, 2024, from <https://algorand.co/blog/how-blockchain-is-transforming-disaster-relief>

Mearian, L. (2019, July 08). 8 persistent problems with blockchain. *Computerworld.* Retrieved December 5, 2024, from <https://www.computerworld.com/article/1714520/8-persistent-problems-with-blockchain.html>

Mell, P., & Grance, T. (2011). *The NIST definition of cloud computing.* National Institute of Standards and Technology. Retrieved December 5, 2024, from <https://nvlpubs.nist.gov/nistpubs/Legacy/SP/nistspecialpublication800-145.pdf>