
Trials & Triumphs: A Closer Look at Software Engineering Challenges

Software Engineering?

A disciplined approach to the **design, development, testing, deployment, and maintenance** of software. It *applies engineering principles* to create **reliable, efficient, maintainable, and scalable** software systems.

There have been several *victories and knock-outs* in the precinct of Software Engineering:

Software Knocks:

⊗ **Therac-25 Radiation Therapy Machine:**

Year: 1985-1987

Details: The Therac-25 was a radiation therapy machine used to treat cancer patients. Due to a series of software bugs, it delivered massive **overdoses of radiation, causing severe injuries and deaths**. The primary cause was *inadequate software testing* and *poor user interface design*.

⊗ **Windows Vista:**

Year: 2007

Details: Windows Vista was an operating system released by Microsoft. It was criticized for its high system requirements, **poor performance**, and **numerous compatibility issues** with hardware and software. These issues led to widespread *dissatisfaction* and *a rapid decline in market share*.

⊗ **Knight Capital Group Trading Glitch:**

Year: 2012

Details: Knight Capital Group experienced a major software failure when a new trading algorithm went live. The algorithm malfunctioned, causing **erratic trades** and resulting in a **loss of \$440 million** within 45 minutes. The incident highlighted the **risks of automated trading systems** *without proper safeguards*.

⊗ **Healthcare.gov Launch:**

Year: 2013

Details: The initial launch of the Healthcare.gov website, part of the Affordable Care Act, was plagued with issues including **slow loading times, frequent crashes**, and an inability to handle **the volume of users**. The problems were attributed to *poor project management* and *insufficient testing*.

⊗ **Boeing 737 Max MCAS Software:**

Year: 2018-2019

Details: The Manoeuvring Characteristics Augmentation System (MCAS) on Boeing 737 Max aircraft had a critical software flaw that caused **two fatal crashes**. The system's erroneous activation led to the aircraft entering a **nosedive**. The failure was linked to *inadequate design* and *lack of proper safety testing*.

Software Victories:

⊗ **Microsoft Windows:**

Year: 1985-Present

Details: Microsoft Windows has been a **dominant operating system** for personal computers since its release. It *revolutionized the PC industry* with its **user-friendly graphical interface** and **compatibility** with a wide range of hardware and software. Versions like **Windows 95, XP, and Windows 10** are particularly notable for their success.

⊗ **Linux Operating System:**

Year: 1991-Present

Details: Linux, an **open-source operating system**, has become a **backbone for many servers, supercomputers, and embedded systems**. Its success lies in its **stability, security**, and the collaborative nature of its **development**. It has also spawned popular distributions like **Ubuntu** and **Red Hat**.

⊗ **Google Search Engine:**

Year: 1998-Present

Details: Google's search engine *revolutionized the way people find information on the internet*. Its success is attributed to its *powerful PageRank algorithm*, which provided *more relevant search results* compared to competitors. Google Search remains the most widely used search engine globally.

⊗ **Apple iOS and App Store:**

Year: 2007-Present

Details: Apple's iOS operating system and the App Store have been hugely *successful in the smartphone market*. The App Store's **curated** and **secure environment** has attracted *millions of developers* and *billions of app downloads*, contributing significantly to Apple's revenue and user experience.

⊗ **Salesforce CRM:**

Year: 1999-Present

Details: Salesforce *revolutionized customer relationship management (CRM)* by offering a cloud-based solution. Its **platform-as-a-service model** allowed businesses to **manage customer interactions** and **data efficiently**. Salesforce's success is evident in its widespread adoption across various industries and its position as a **market leader in CRM solutions**.

Patch Fails, World Wails: The Great CrowdStrike Meltdown

CrowdStrike-Microsoft outage, which caused significant disruptions for users worldwide. Here's what to note:

➤ **Cause of the Outage:**

- **CrowdStrike**, a cybersecurity company widely used by businesses and government agencies running on Microsoft Windows devices, released an update to its antivirus software.
- Unfortunately, this update contained a defect that triggered the issue.

➤ **Impact:**

- The incident resulted in arguably the largest global information technology outage in history.
- Approximately **8.5 million Windows devices** (less than 1% of all Windows machines) were affected.

➤ **Collaborative Efforts:**

- **Microsoft** took mitigation actions to address the lingering impact of the outage.
- Both **AWS** and **GCP** collaborated with Microsoft to find effective solutions.

➤ **Lessons Learned:**

- This event highlights the interconnected nature of our tech ecosystem.
- It emphasizes the importance of safe deployment and disaster recovery mechanisms.

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