

# Software Maintenance and Sustainability

Software maintenance is an ongoing process that ensures software remains functional, secure, and efficient after deployment. Maintenance is necessary to fix bugs, improve performance, and add new features based on user feedback.

There are four main types of software maintenance:

1. Corrective Maintenance – Fixes bugs and errors found after deployment.
2. Adaptive Maintenance – Modifies software to work with updated hardware or operating systems.
3. Perfective Maintenance – Enhances software performance, improves UI/UX, and adds new features.
4. Preventive Maintenance – Improves software architecture to reduce future risks.

For example, mobile apps like WhatsApp receive regular updates to introduce new functionalities, improve security, and fix bugs. Without maintenance, software becomes outdated, vulnerable to cyber threats, and incompatible with new hardware.

Sustainable software development is becoming increasingly important. Large-scale data centres consume vast amounts of energy, raising concerns about environmental impact. Companies like Google and Amazon are investing in energy-efficient coding practices, cloud optimisation, and carbon-neutral data centres to reduce computing's environmental footprint. Facebook frequently updates its mobile app to optimise speed, add features, and patch security flaws.

Developers must also consider ethical implications, such as minimising bias in AI algorithms, protecting user privacy, and ensuring software accessibility for all users.



As software becomes more complex, maintaining scalability, security, and sustainability will be key challenges for software engineers.